N. & W. RY.

OFF. OF SUPT. TELE. & SIGNALS

ROANOKE, VA

INDEX - N. & W. RY. CO. SIGNAL DEPT. STANDARD DRAWINGS

Air Compressor E-641-A

Clearance Diagram E-683-A
Continuous Joint Insulation E-573-A
Cover for Signal Mechanism Case E-298-A
CP Valve Piping E-685-A
Crossarms E-699-A

Derails and Bolt Locks, Pipe Connected . . E-484-A
Diagram, Clearance E-683-A

Fouling Bond E-670-A
Foundation, C. P. Valve E-517-A
Foundation, Steel Instrument House . . . E-675-A
Foundation, Air Compressor E-641-A
Foundation Form, Sheet Steel Relay Case . . E-682-A
Foundations, Miscellaneous E-690-A

Gates, Model 10, Short-arm, Highway Crossing. E-692-A

Highway Crossing Flashing Light Signals . . E-691-A
Highway Crossing Short-arm Gates, Model 10 . E-692-A

Insulation, Continuous Joint E-573-A

Joint, Continuous Insulation E-573-A

Layout, Switch - Direct Acting Movement . . E-693-A
Layout, Switch - A-1, A-5 Movement . . . E-649-A
Layout, Switch - T-20, T-21 Movement . . E-637-A
Layout, Switch - A-21 Movement E-591-A
Layout, Switch - M-2 Movement E-502-A
Layout, Switch - M-22, M-23-A Movement . . E-684-A
Lock Rods E-674-A
Layout, Switch - S-20, S-21 Movement . . . E-650-A

Pipe Connected Derails and Bolt Locks E-484-A
Pipe Housing ("U" Box) - E-517-A
Platform - P.L. Bracket Signal E-667-A
Position Light Signals E-635-A
Position Light Signals, Unit Assemblies E-689-A
Punches, Bonding and Rivet E-696-A

Rail Connectors E-701-A
Relay Case, Sheet Steel, and Foundation Form. . . . E-682-A
Rods, Lock E-674-A
Rods, Miscellaneous E-681-A
Rods, Point Detector Operating E-680-A
Rods, Raco Switch Circuit Controller E-686-A
Rods, Switch Operating E-679-A

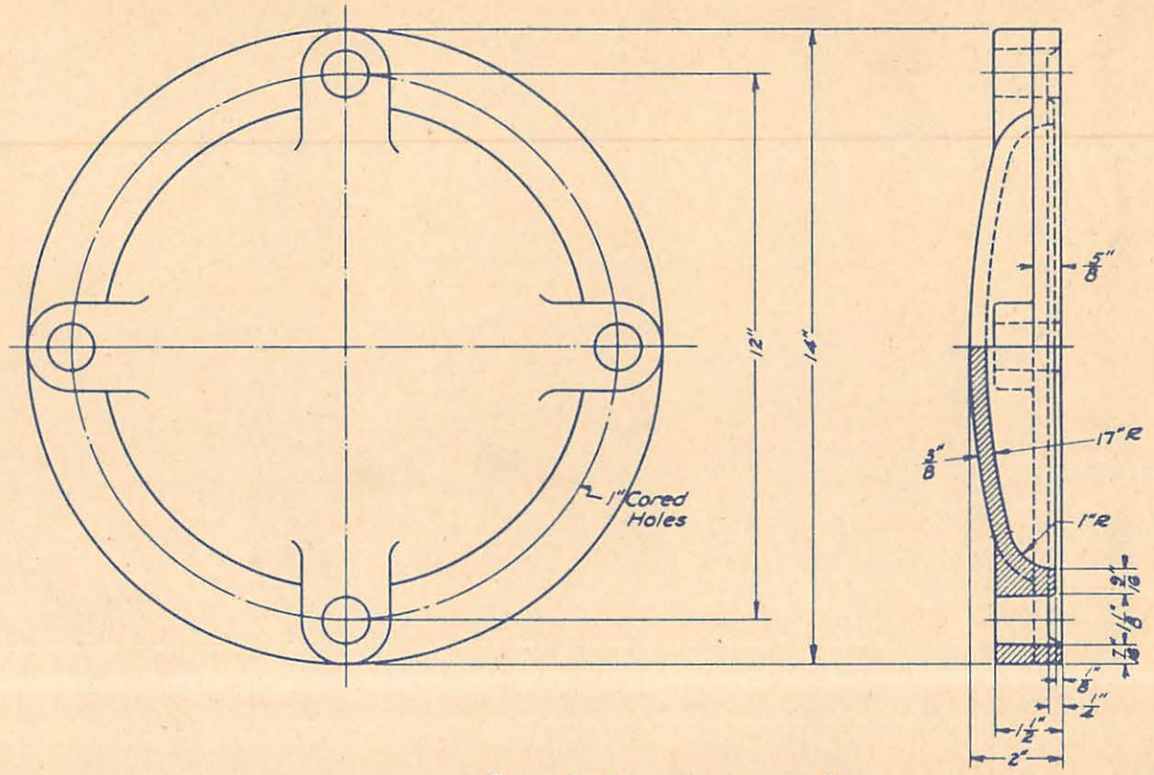
Sign, "No Turn" E-698-A
Signals, Highway Crossing, Flashing Light. E-691-A
Signal - Train Order and Switching. E-687-A
Signals, Position Light. E-635-A
Switch Shunt Installation E-700-A

Tie Spacing at Insulated Joint. E-676-A
Train Approach Indicator. E-522-A

"U" Box (Pipe Housing) E-517-A

Rev. 10-1-53
5-20-54 10-3-55.

RECEIVED
OCT 10 1955
CUSTOMER
SERVICES
DEPT.
ORD. SECT.



Cover for Signal Mechanism Case
C.I. Pat. No. 16917

REVISIONS
REV. & REDN. 4-29-46 M.D.G.

0 1 2
INCHES

ONE SHEET E-298-A

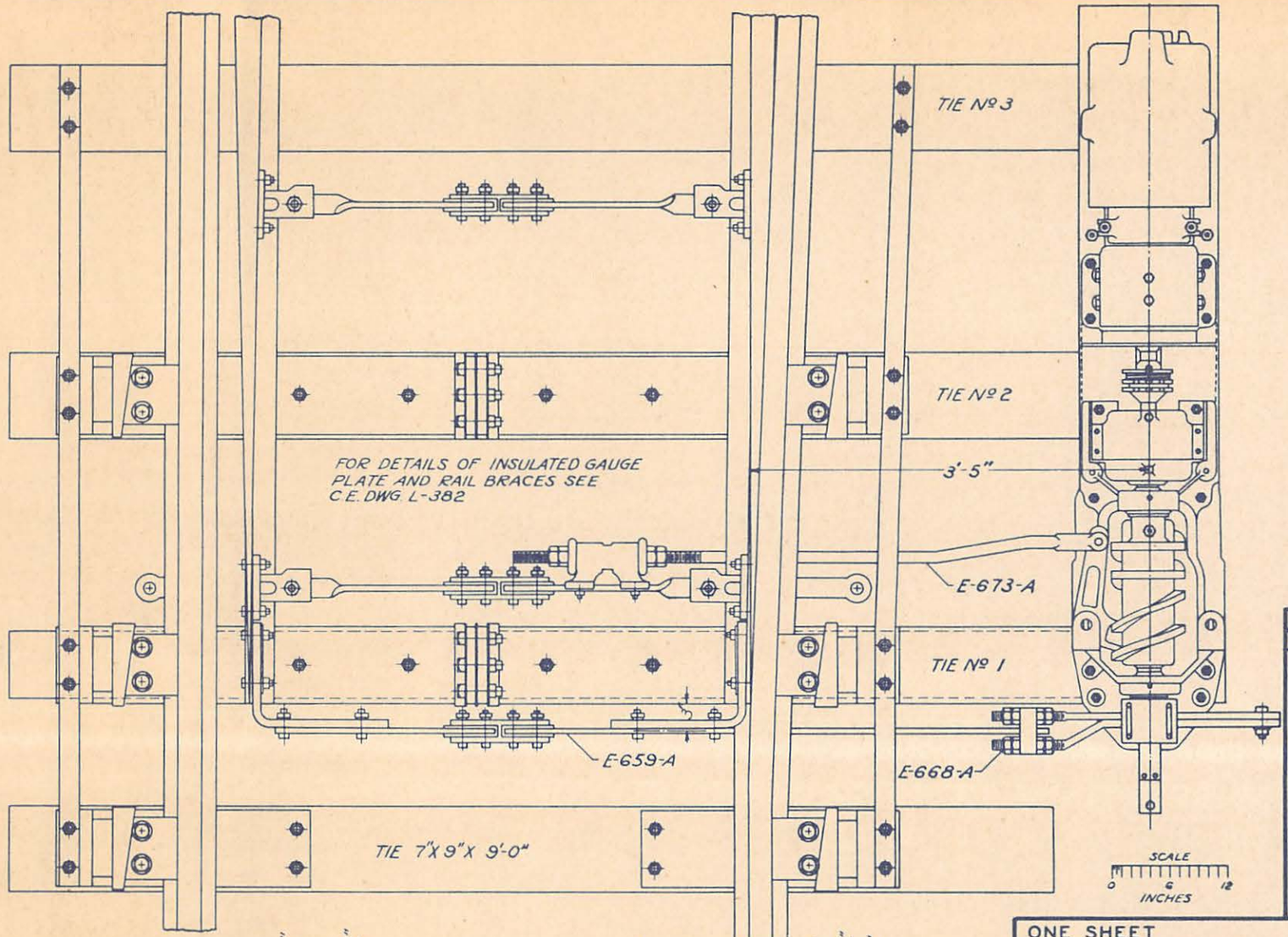
N. & W. Ry.

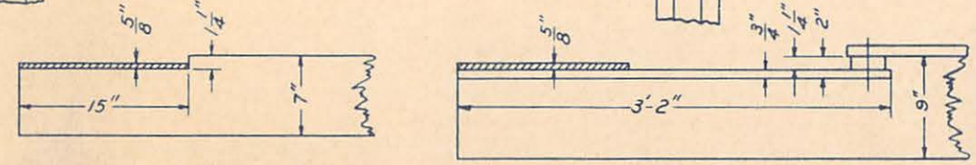
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

COVER FOR SIGNAL MECHANISM CASE

ROANOKE, VA. OCT. 13 1915

E-298-A





TIE Nº 2 & 3 7"X 9"X 11'-0"

TIE Nº 1. 7"X 9"X 11'-0"

REVISIONS
REV. & RED'N. 10-2-44 mdc

ONE SHEET E-476-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT, STYLE B3 SWITCH MOVEMENT WITH PLANETARY REDUCTION GEAR. FOR SINGLE SWITCHES.

ROANOKE, VA. JAN. 11, 1929

E-476-A

UNITS REQUIRED PER ASSEMBLY									
Switch Connection No. 1	Switch Connection No. 2	Switch Connection No. 3	Switch Connection No. 4	Figure No. 1	Figure No. 2	Figure No. 3	Figure No. 4	Figure No. 5	
				1		1	1	2	Lazy Jack Compensator
		1							Straight Arm Crank
1	1		2	1	3	1		3	11-3/4" x 11-3/4" 90° One Way Horiz. Crank
							1	1	One Way Bolt Lock, complete
				2	4	3	2	6	1¼" Solid Jaw, complete
1	1	1	1	1	3	2	2	6	1¼" Screw Jaw, complete
1									Connecting Link D (Inc. 1¼" Pin & Cotter)
	1							1	*Connecting Link E (For 130# or 131# Rail)
	*							*	Connecting Link K (For 100# Rail)
			1						Connecting Link X - Sketch 2567
		1	1						Connecting Link Y - Sketch 2567
	1							1	**Connecting Plate H (For 130# or 131# Rail)
	**							**	Connecting Plate J (For 100# Rail)
1	1	1	2	1	3	1		3	Crank Plate A - ½" x 7" x 29"
									Crank Plate B - ½" x 7" x 29"
				1		1	1	2	Compensator Plate F - ½" x 9" x 30"
							1	1	Bolt Lock Plate G - ½" x 7" x 34"
				1				1	Derail Rod - Dwg. E-681-A, Fig. 1
				1	1	1	1	2	Pipe Line Insulation
				250	270	260	260	325	Ft. 1" Galv. Pipe, Plugged & Riveted
				30	30	30	30	43	Strap Pipe Carrier
						1	1	2	One Way Transverse Pipe Carrier
							1	1	Front Rod, Dwg. E-659, Assembly No. 2
							1	1	Right Hand Switch Foot
							1	1	Left Hand Switch Foot
2	2	2	6	4	6	4	4	12	3/4" x 11" Bolt, Threaded Both Ends
							4	4	3/4" x 4½" Special Thin Head Bolt
2	2	2		2	6	2	2	8	3/4" x 2½" Bolt
6	6	6	12	10	18	10	18	40	3/4" Hex Nut
2	2	2	6	4	6	4	4	12	3/4" Plate Washer
4	4	4	6	6	12	6	14	28	3/4" Lock Washer
1	2	2	4	2				4	7/8" x 2¼" C. H. Pin
1	2	2	4	2				4	3/16" x 1½" Cotter Key
				2#	2#	2#		3#	Pipe Rivets
				60	60	60	60	86	½" x 2½" Lag Screw
2		2	6	4	6	6	6	16	3/4" x 6" Lag Screw
10	10			20	20	20	30	60	Ft. ½" x 2" Strap Iron
1	1			4	4	4	2	8	7" x 9" x 10'0" Treated Oak Tie
							4	4	3/4" x 3-3/4" Bolts

REVISIONS

SHEET 2 OF 2 E-484-A

N. & W. RY.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

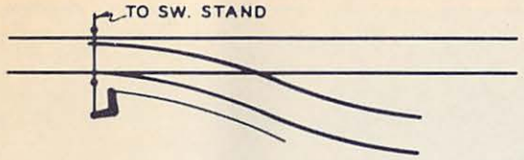
PIPE CONNECTED DERAILS AND BOLT LOCKS

ROANOKE, VA. OCT. 29, 1948

E-484-A

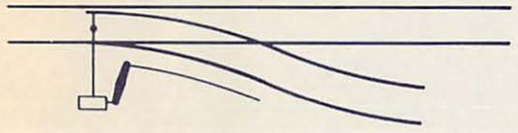
* Omit Link E and Order Link K for 100# Rail
** Omit Plate H and Order Plate J for 100# Rail

SPECIFICATION DEPT.
RECEIVED
DEC 8 1948

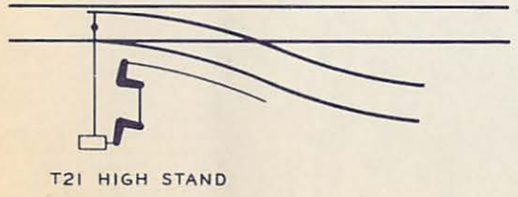


SWITCH CONNECTION No. 1

SWITCH CONNECTION No. 2



SWITCH CONNECTION No. 3
SEE E-637-A SH. 2



SWITCH CONNECTION No. 4
SEE E-637-A SH. 1

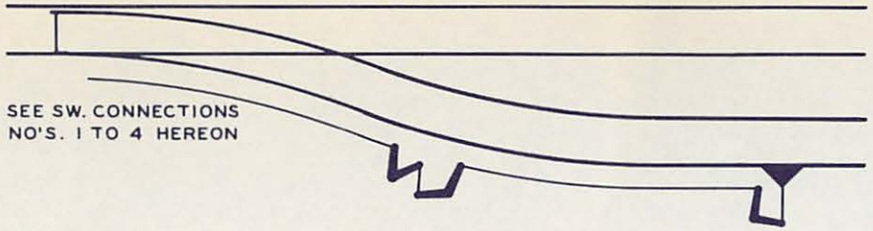


FIGURE 1

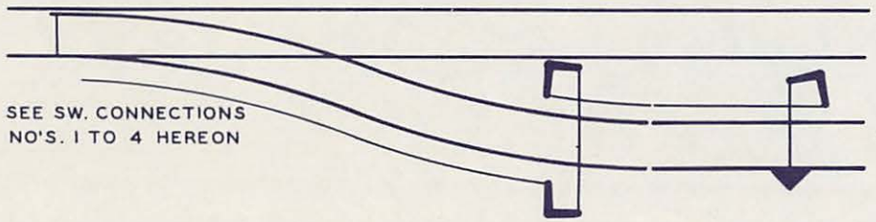


FIGURE 2

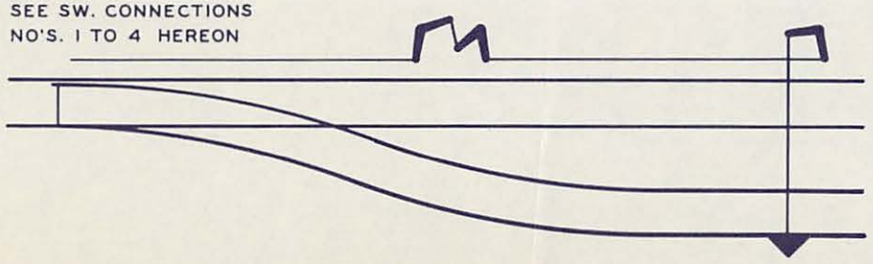


FIGURE 3

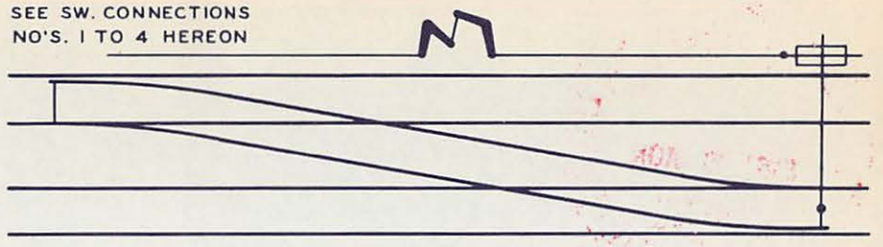


FIGURE 4

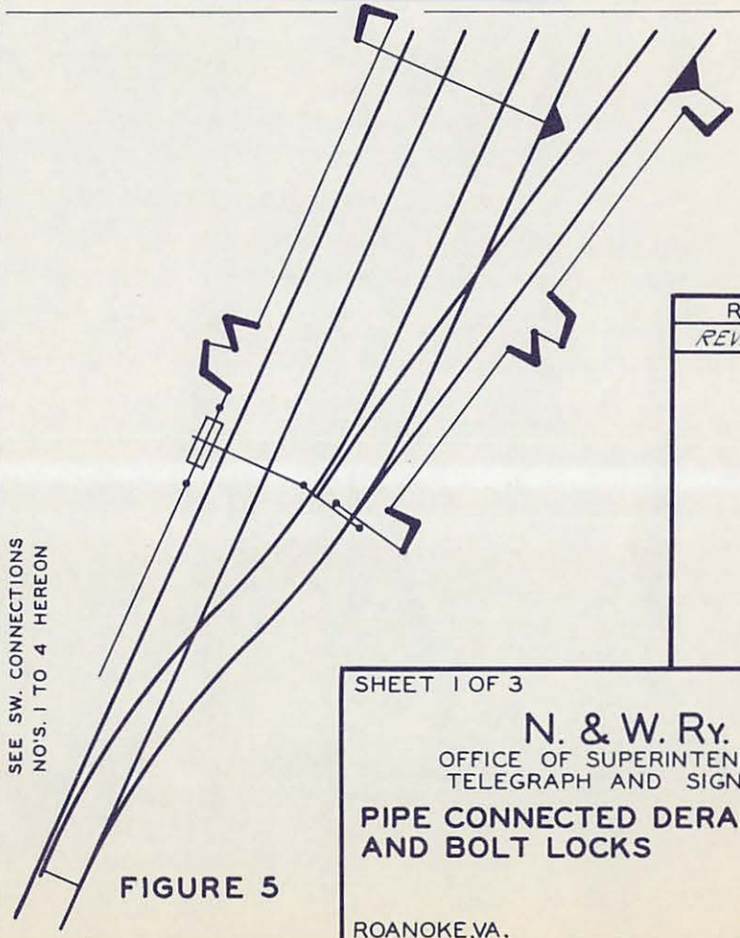


FIGURE 5

REVISIONS

REV. 1-6-53.

SHEET 1 OF 3 E-484-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

PIPE CONNECTED DERAILS AND BOLT LOCKS

ROANOKE, VA. OCT. 29, 194[illegible]

E-48

RECEIVED
NOV 2 1953
ORD

UNITS REQUIRED PER ASSEMBLY									
Switch Connection No. 1	Switch Connection No. 2	Switch Connection No. 3	Switch Connection No. 4	Figure No. 1	Figure No. 2	Figure No. 3	Figure No. 4	Figure No. 5	
				1		1	1	2	Lazy Jack Compensator
		1							Straight Arm Crank, E-637-A, Sh. 2
1	1		2	1	3	1		3	11-3/4" x 11-3/4" 90° One Way Horiz. Crank
							1	1	One Way Bolt Lock, complete
				2	4	3	2	6	1¼" Solid Jaw, complete
1	1	1	1	1	3	2	2	6	1¼" Screw Jaw, complete
1									Connecting Link D (Inc. 1¼" Pin & Cotter) Sh. 3
	1							1	*Connecting Link E (For 130# or 131# Rail) Sh. 3
	*							*	Connecting Link K (For 100# Rail) Sh. 3
			1						Connecting Link X - Sketch 2567 Sh. 3
		1	1						Connecting Link Y - Sketch 2567 Sh. 3
	1							1	**Connecting Plate H (For 130# or 131# Rail) Sh. 3
	**							**	Connecting Plate J (For 100# Rail) Sh. 3
									~~Crank Plate A - ½" x 7" x 29"~~
									~~Crank Plate B - ½" x 7" x 29"~~
				1		1	1	2	Compensator Plate F - ½" x 9" x 30" Sh. 3
							1	1	Bolt Lock Plate G - ½" x 7" x 34" Sh. 3
				1				1	Derail Rod - Dwg. E-681-A, Fig. 1
				1	1	1	1	2	Pipe Line Insulation
				250	270	260	260	325	Ft. 1" Galv. Pipe, Plugged & Riveted
				30	30	30	30	43	Strap Pipe Carrier
						1	1	2	One Way Transverse Pipe Carrier
							1	1	Front Rod, Dwg. E-659, Assembly No. 2
							1	1	Right Hand Switch Foot
							1	1	Left Hand Switch Foot
2	2	2	6	4	6	4	4	12	3/4" x 11" Bolt, Threaded Both Ends
							4	4	3/4" x 4½" Special Thin Head Bolt
2	2	2		2	6	2	2	8	3/4" x 2½" Bolt
6	6	6	12	10	18	10	18	40	3/4" Hex Nut
2	2	2	6	4	6	4	4	12	3/4" Plate Washer
4	4	4	6	6	12	6	14	28	3/4" Lock Washer
1	2	2	4	2				4	7/8" x 2¼" C. H. Pin
1	2	2	4	2				4	3/16" x 1½" Cotter Key
				2#	2#	2#		3#	Pipe Rivets
				60	60	60	60	86	½" x 2½" Lag Screw
2		2	6	4	6	6	6	16	3/4" x 6" Lag Screw
10	10			20	20	20	30	60	Ft. ½" x 2" Strap Iron
1	1			4	4	4	2	8	7" x 9" x 10'0" Treated Oak Tie
							4	4	3/4" x 3-3/4" Bolts
									~~Crank Plate Fig. 1 - Sk. 2567~~
1	1	1	2	1	3	1		3	Universal Crank Plate "A", Sh. 3

REVISIONS
7-12-51
9-30-53

SHEET 2 OF 3 E-484-A

N. & W. RY.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

PIPE CONNECTED DERAILS AND BOLT LOCKS

ROANOKE, VA. OCT. 29, 1948

E-484-A

* Omit Link E and Order Link K for 100# Rail
** Omit Plate H and Order Plate J for 100# Rail

RECEIVED
NOV 2 1953
ORG. INTER. SES.

UNITS REQUIRED PER ASSEMBLY									
*Switch Connection No. 1	Switch Connection No. 2	Switch Connection No. 3	Switch Connection No. 4	Figure No. 1	Figure No. 2	Figure No. 3	Figure No. 4	Figure No. 5	
				1		1	1	2	Lazy Jack Compensator
		1							Straight Arm Crank, E-637-A, Sh. 2
1	1		2	1	3	1		3	11-3/4" x 11-3/4" 90° One Way Horiz. Crank
							1	1	One Way Bolt Lock, complete
				2	4	3	2	6	1¼" Solid Jaw, complete
1	1	1	1	1	3	2	2	6	1¼" Screw Jaw, complete
1									Connecting Link D (Inc. 1¼" Pin & Cotter) Sh. 3
	1								*Connecting Link E (For 130# or 131# Rail) Sh. 3
	*								Connecting Link K (For 100# Rail) Sh. 3
			1						Connecting Link X - Sh. 3
		1	1						Connecting Link Y - Sh. 3
	1								**Connecting Plate H (For 130# or 131# Rail) Sh. 3
	**								Connecting Plate J (For 100# Rail) Sh. 3
									~~Crank Plate A - ½" x 7" x 29"~~
									~~Crank Plate B - ½" x 7" x 29"~~
				1		1	1	2	Compensator Plate F - ½" x 9" x 30" Sh. 3
							1	1	Bolt Lock Plate G - ½" x 7" x 34" Sh. 3
				1				1	Derail Rod - Dwg. E-681-A, Fig. 1
				1	1	1	1	2	Pipe Line Insulation
				250	270	260	260	325	Ft. 1" Galv. Pipe, Plugged & Riveted
				30	30	30	30	43	Strap Pipe Carrier
						1	1	2	One Way Transverse Pipe Carrier
							1	1	Front Rod, Dwg. E-659, Assembly No. 2 A
							1	1	Right Hand Switch Foot
							1	1	Left Hand Switch Foot
2	2	2	6	4	6	4	4	12	3/4" x 11" Bolt, Threaded Both Ends
							4	4	3/4" x 4½" Special Thin Head Bolt
2	2	2		2	6	2	2	8	3/4" x 2½" Bolt
6	6	6	12	10	18	10	18	40	3/4" Hex Nut
2	2	2	6	4	6	4	4	12	3/4" Plate Washer
4	4	4	6	6	12	6	14	28	3/4" Lock Washer
1	2	2	4	2				4	7/8" x 2¼" C. H. Pin
1	2	2	4	2				4	3/16" x 1½" Cotter Key
				2#	2#	2#	2#	3#	Pipe Rivets
				60	60	60	60	86	½" x 2½" Lag Screw
2		2	6	4	6	6	6	16	3/4" x 6" Lag Screw
10	10			20	20	20	30	60	Ft. ½" x 2" Strap Iron
1	1			4	4	4	2	8	7" x 9" x 10'0" Treated Oak Tie
							4	4	3/4" x 3-3/4" Bolts
									~~Crank Plate Fig. 1 - Sh. 2~~
1	1	1	2	1	3	1		3	Universal Crank Plate "A", Sh. 3

REVISIONS
7-12-51
9-30-53
1- 3-55
6- 3-55

SHEET 2 OF 3

E-484-A

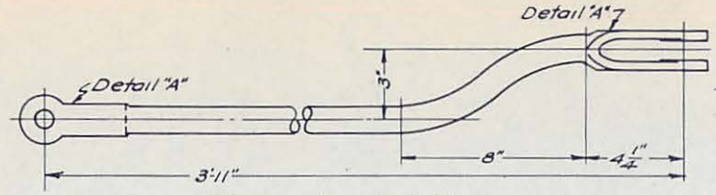
N. & W. RY.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

PIPE CONNECTED DERAILS AND BOLT LOCKS

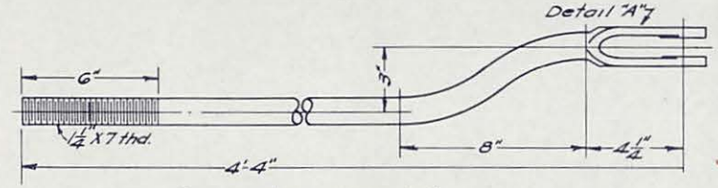
ROANOKE, VA. OCT. 29, 1948

E-484-A

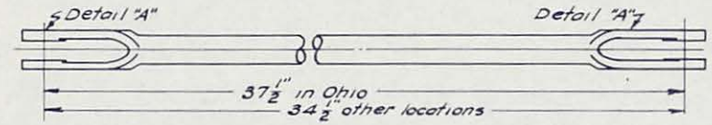
* Omit Link E and Order Link K for 100# Rail
** Omit Plate H and Order Plate J for 100# Rail



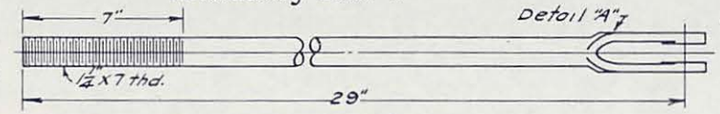
Connecting Link "E"



Connecting Link "K"



Connecting Link "X"



Connecting Link "Y"

Furnish comp. with screw jaw, nut and lock washer

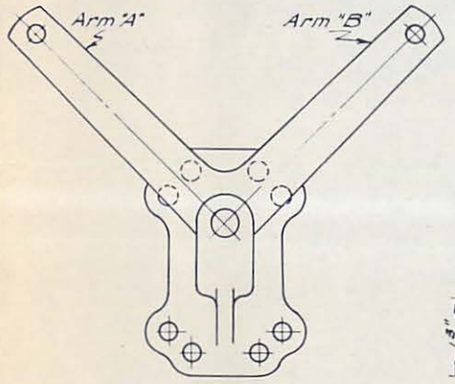
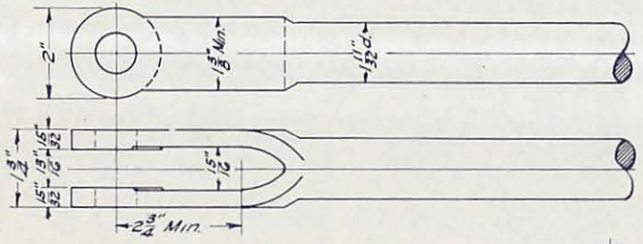
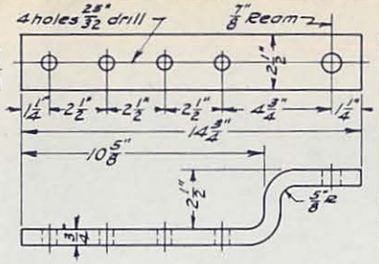


FIGURE 1

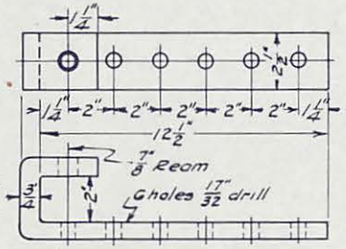
For reference in ordering cranks with set in arms. Specify arm "A" or "B" to be upset or downset required amount.



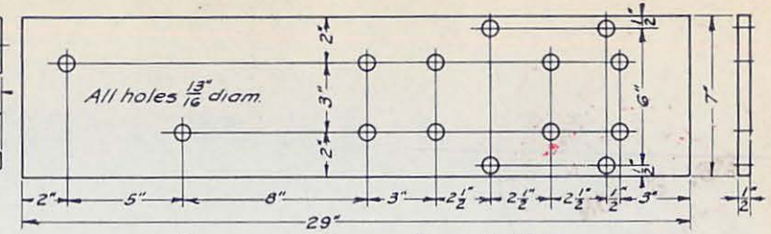
DETAIL "A" FORGED STEEL.



CONNECTING PLATE "H"

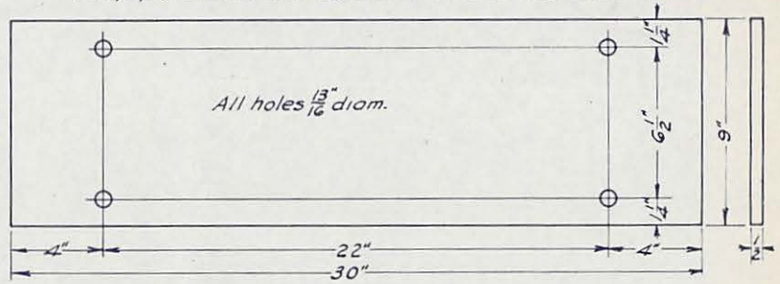


CONNECTING PLATE "J"



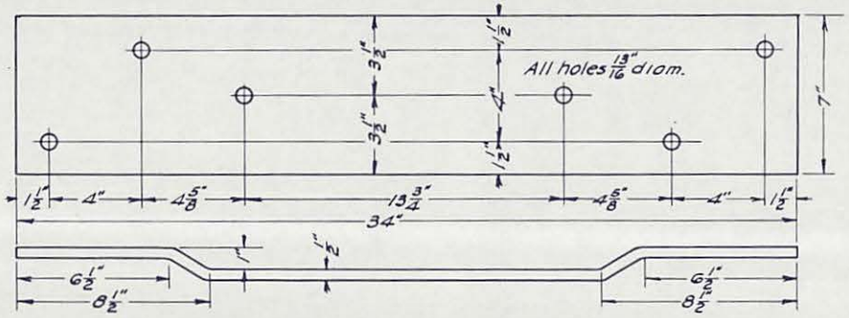
UNIVERSAL CRANK PLATE "A"- STEEL

Shop paint one coat Zinc Chromate or Red Lead.



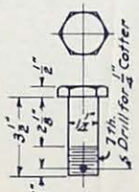
COMPENSATOR PLATE "F"- STEEL

Shop paint one coat Zinc Chromate or Red Lead.

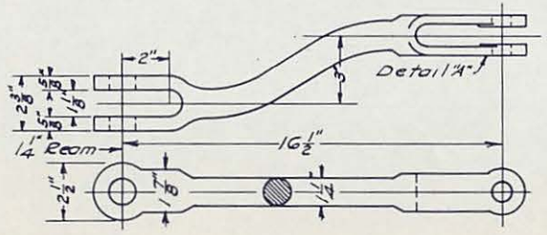


BOLT LOCK PLATE "G" STEEL

Shop paint one coat Zinc Chromate or Red Lead.



Furnish complete with thin castle nut and cotter



SWITCH CONNECTION "D", Comp. with 1 1/4" Bolt.

REVISIONS

SHEET 3 OF 3 E-484-A

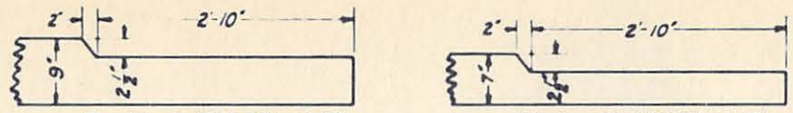
N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

PIPE CONNECTED DERAILS AND BOLT LOCKS

ROANOKE, VA. SEP. 30, 1953

RECEIVED
NOV 2 1953
ORD. INTER S.



Tie No. 1 - 7"X9"X11'-7"

Tie No. 2 - 7"X9"X11'-7"

FRAMING OF TIES.

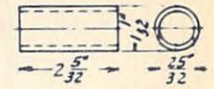



Fig. 2.
Fiber Bushing.

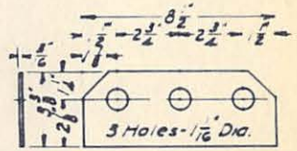
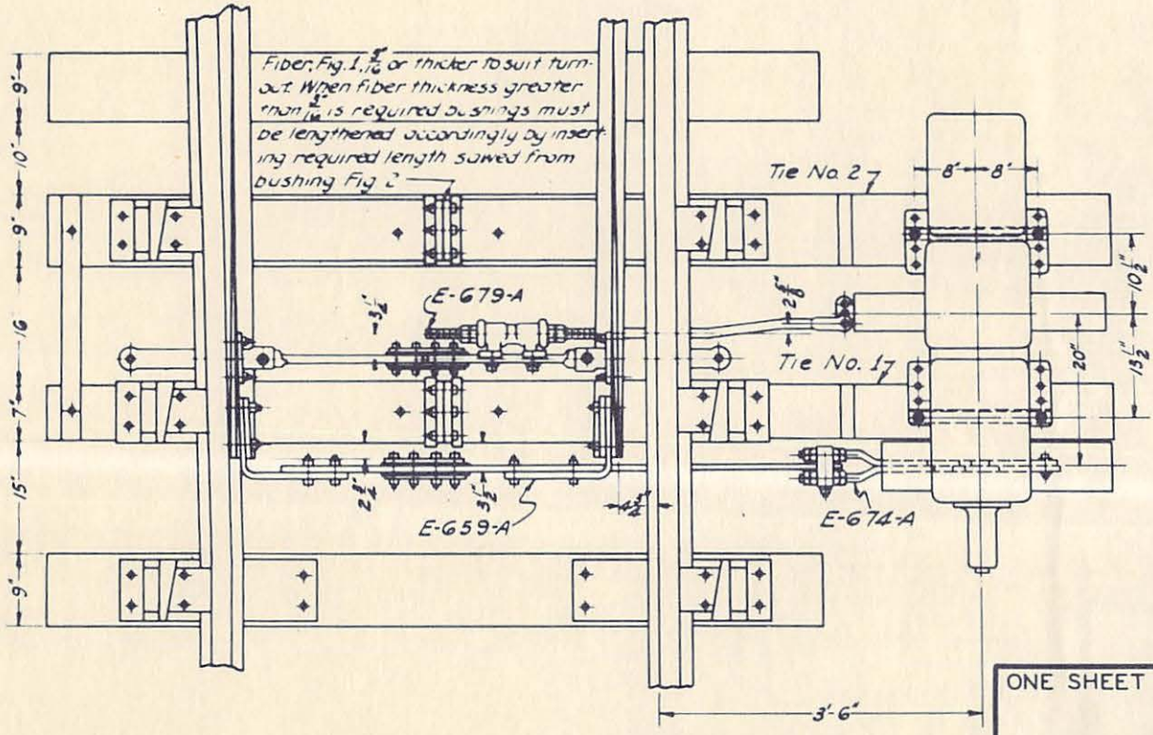


Fig. 1
Gouge Plate Insulating Fiber



REVISIONS
REDRAWN 9-30-47.
REV. 7-16-48. M.D.G.

ONE SHEET E-502-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT, STYLE M2 ELECTRIC SWITCH MOVEMENT

ROANOKE, VA. MARCH 6,1930

E-502-A

SPECIFICATION
DEPT.
RECEIVED
1938

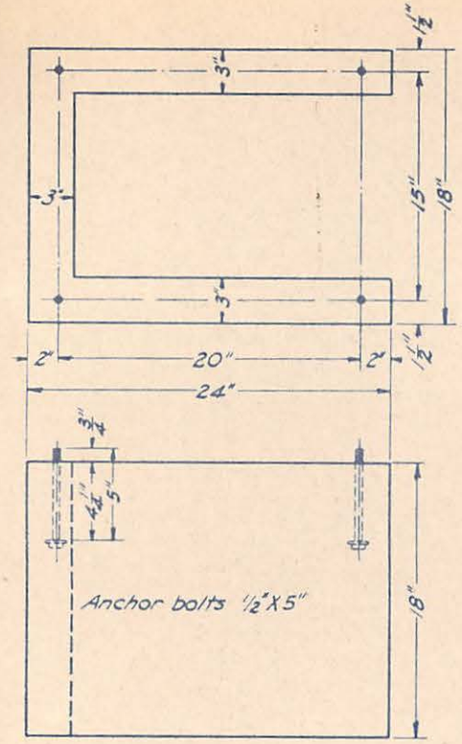


FIG. 2

U-Box (Pipe Housing)
Form to be lined with Masonite or constructed of Plywood. For sheet steel cover see E-591-A, Fig. 3.

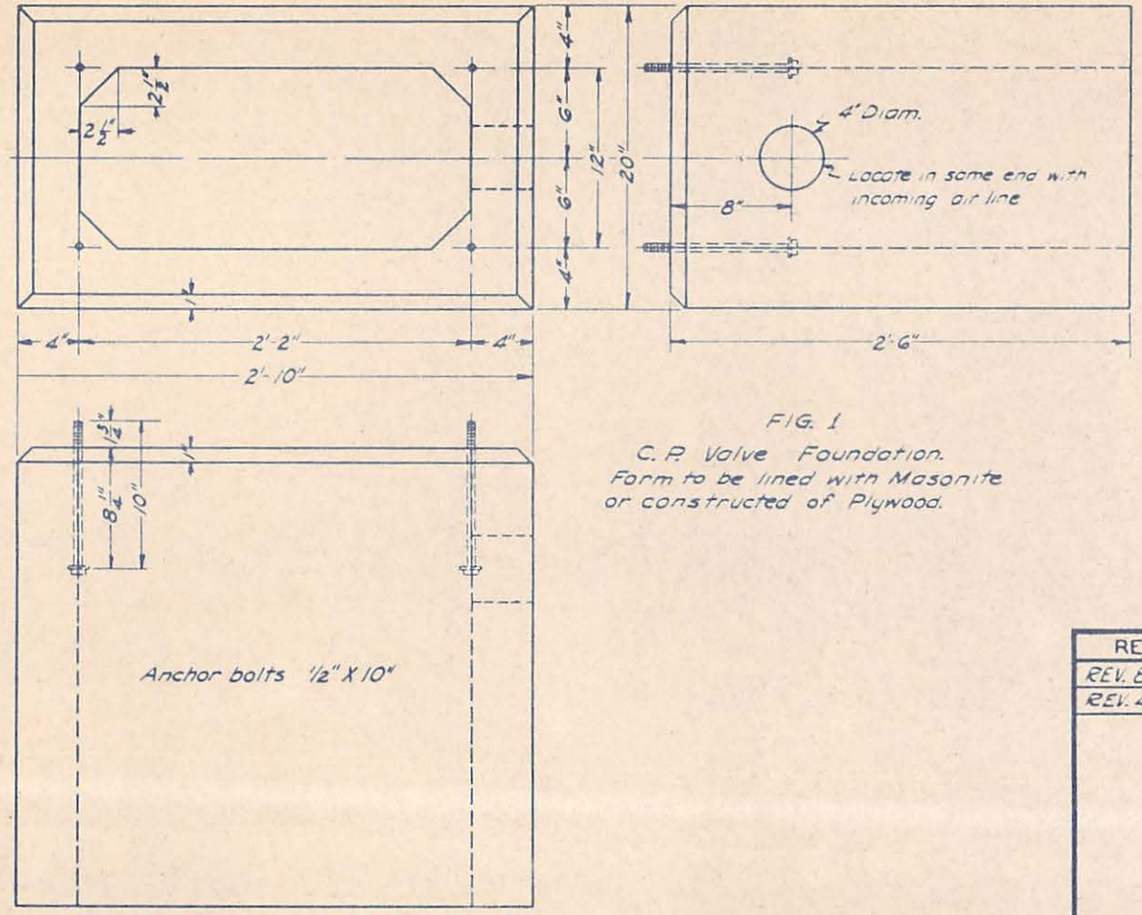


FIG. 1

C. P. Valve Foundation.
Form to be lined with Masonite or constructed of Plywood.

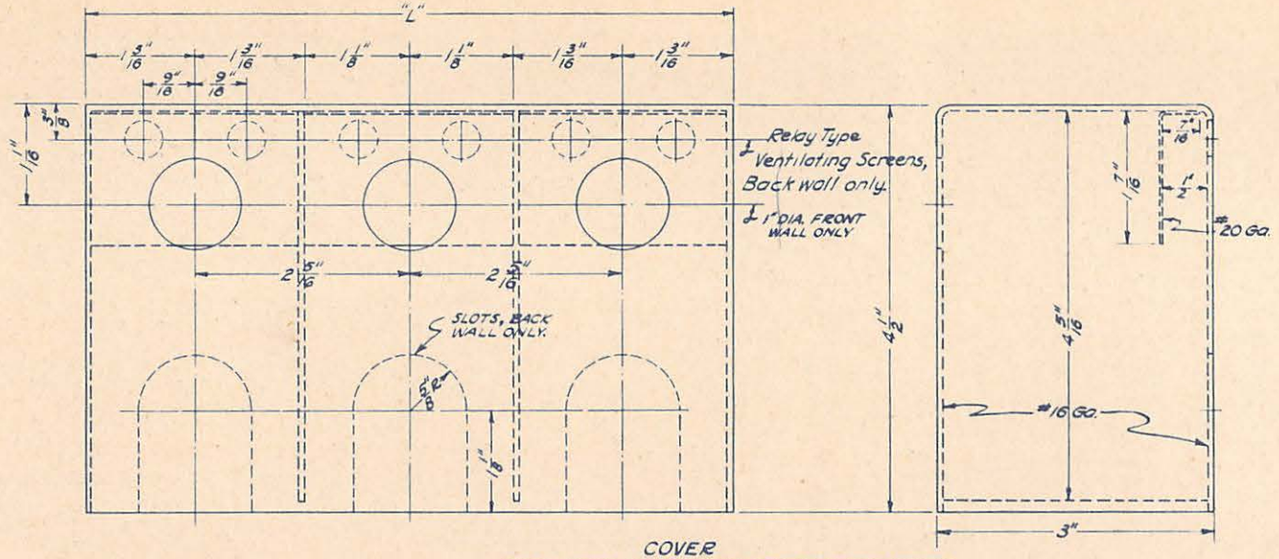
REVISIONS
REV. & RED'N. 2-7-46.
REV. 4-15-46. M.J.G.

ONE SHEET E-517-A

N. & W. Ry.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

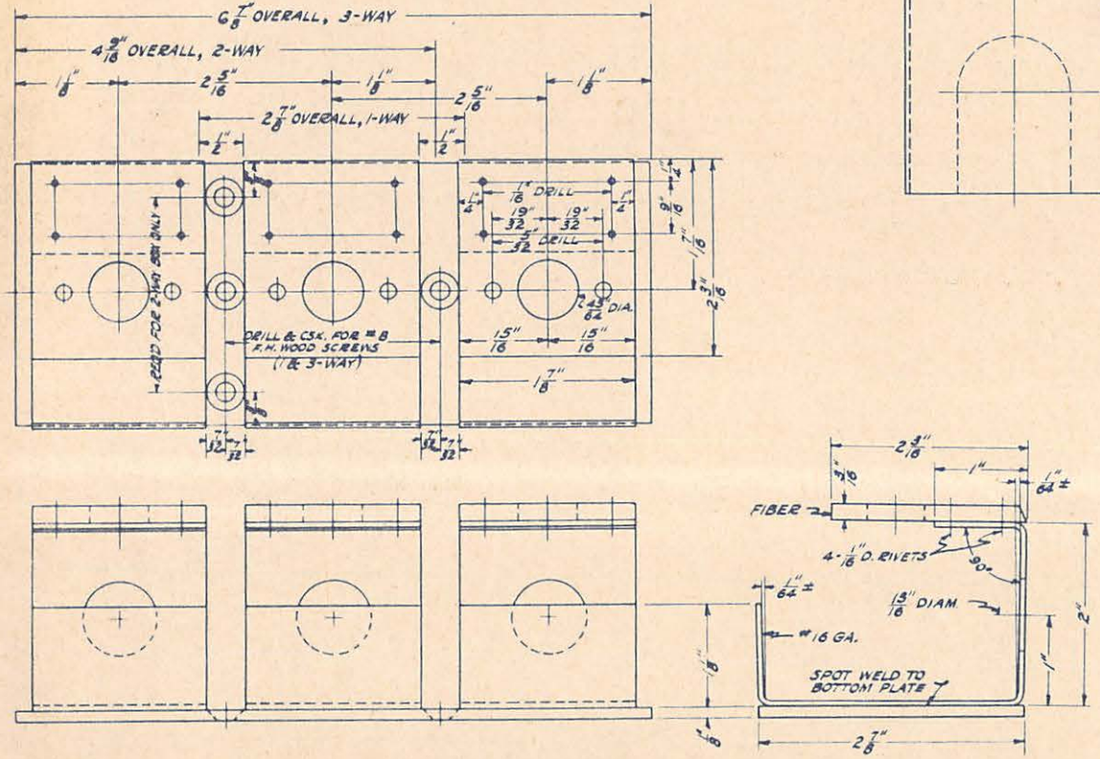
FOUNDATION. C. P. VALVE.
U-BOX (PIPE HOUSING)

ROANOKE, VA. AUG. 8, 1930

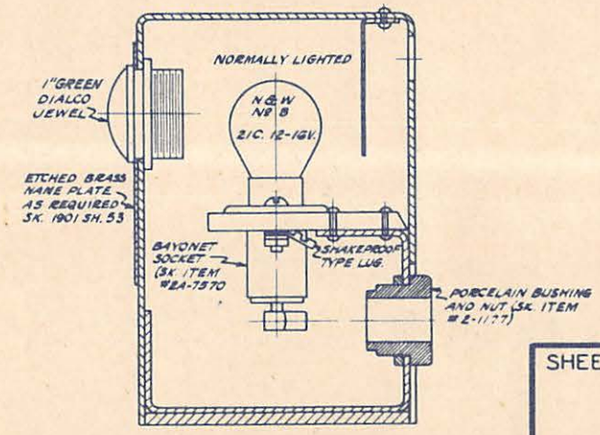


COVER

STEEL - PAINT INSIDE WHITE - OUTSIDE BLACK PRISMLAC.
"L" = 7" FOR 3-WAY COVER AS SHOWN
"L" = 4 11/16" " 2-WAY " NOT SHOWN
"L" = 3" " 1-WAY " " "


6 7/8" OVERALL, 3-WAY
4 9/16" OVERALL, 2-WAY
2 7/8" OVERALL, 1-WAY
DRILL & CSK. FOR #8 F.H. WOOD SCREWS (1 & 3-WAY)
FIBER
4-1/16" D. RIVETS
#16 GA.
SPOT WELD TO BOTTOM PLATE
2 7/8"

3-WAY BASE WITH DIMENSIONS FOR 1 & 2-WAY
STEEL - PAINT WHITE ALL OVER.


NORMALLY LIGHTED
1" GREEN DIALCO JEWEL
N & W No 8
2/C. 12-16V.
ETCHED BRASS NAME PLATE AS REQUIRED SK. 1901 SH. 53
BAYONET SOCKET (SK. ITEM #EA-7370
SHAKEPROOF TYPE LUG.
PORCELAIN BUSHING AND NUT (SK. ITEM #E-1177)

ASSEMBLY CROSS SECTION

REVISIONS
REDRAWN 7-5-45 M.D.G.
Revised 1-30-46 M.D.G.

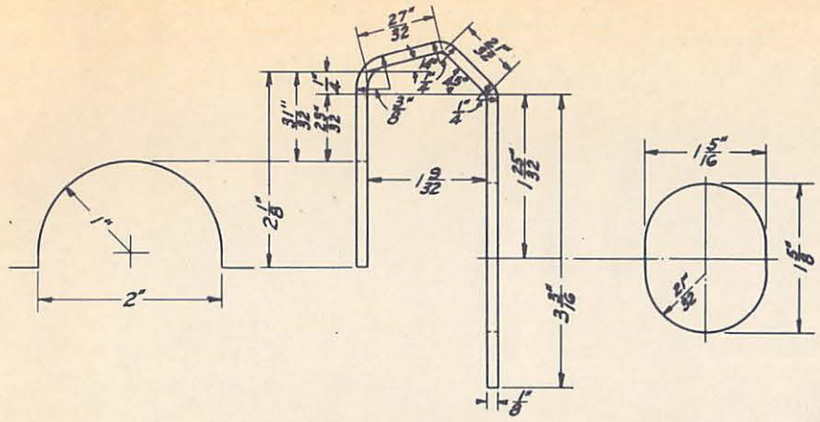
SHEET 1 OF 1 E-522-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

TRAIN APPROACH INDICATOR FOR TELEGRAPH OFFICE

ROANOKE, VA. NOV. 13, 1930



END VIEW FIBER HEAD PIECES
(Fig's. 1 & 2)

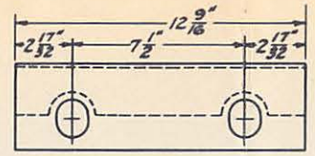


FIG. 1

ELEVATION - FIBER HEAD PIECE
For Four Hole Joint, 131-R.E. Rail

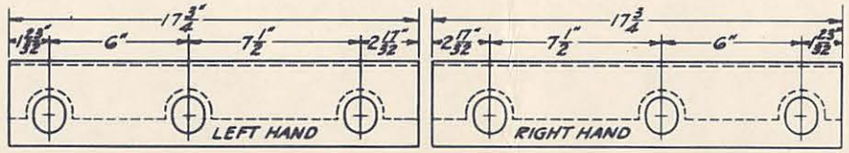


FIG. 2

ELEVATION - FIBER HEAD PIECES
For Six Hole Joint, 131-R.E. Rail

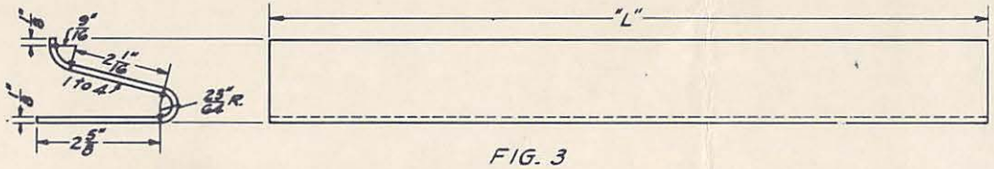


FIG. 3

FIBER BASE PIECES

Joint	"L" Dimension
131-RE, 4 Hole	26"
131-RE, 6 Hole	36"
132-RE, 6 Hole	38"

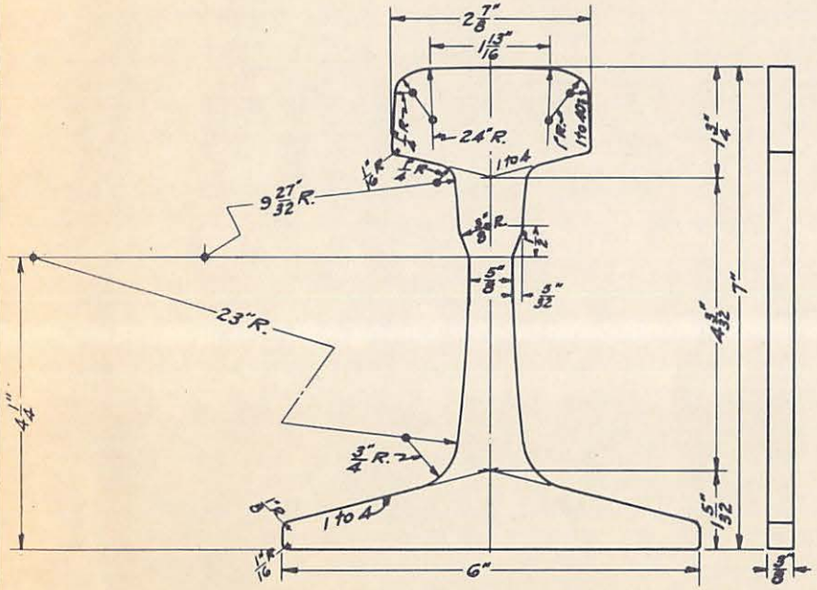


FIG. 4

FIBER END POST
For 131-RE Rail

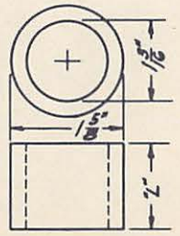


FIG. 5

FIBER BUSHINGS
"L" = 1 5/8" for 131-RE Rail
"L" = 1 5/8" for 132-RE Rail

REVISIONS
REV. & RED'N. 1-24-49.
REVISED 2-19-49.
REVISED 3-22-49.
10-6-52

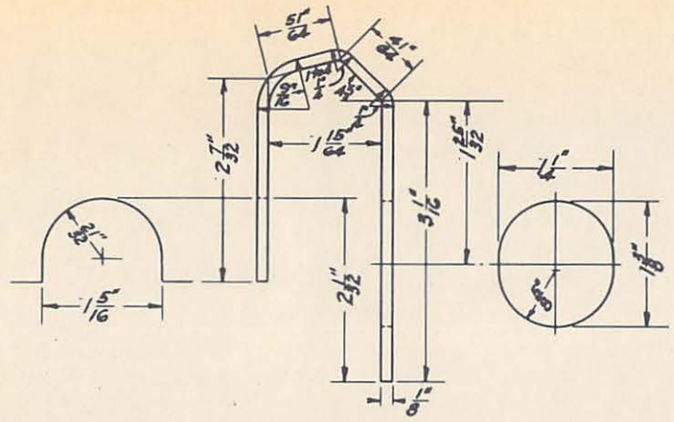
SHEET 1 OF 3 E-573-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

CONTINUOUS JOINT INSULATION - 131-RE, 132-RE AND 140-PS RAIL

ROANOKE, VA. JUNE 22, 1934



END VIEW of FIBER HEAD PIECE
(Fig. 6)

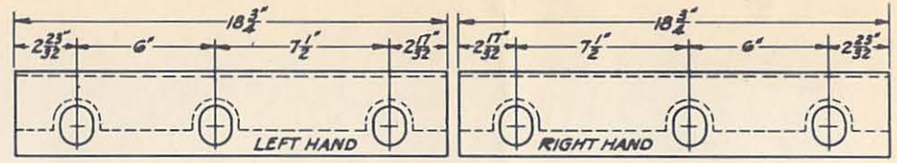


FIG. 6
ELEVATION - FIBER HEAD PIECE
For 132-RE Rail

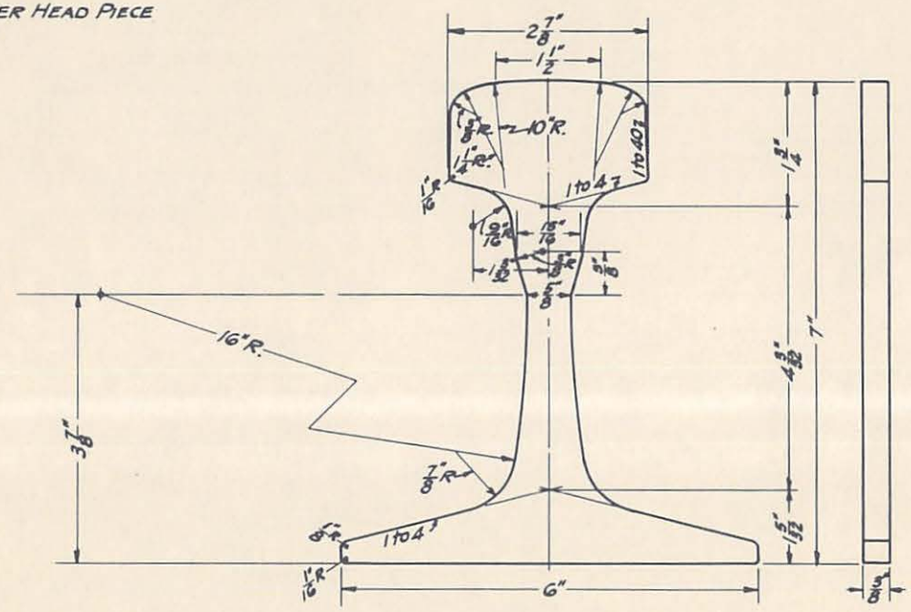


FIG. 7
FIBER END POST
For 132-RE Rail

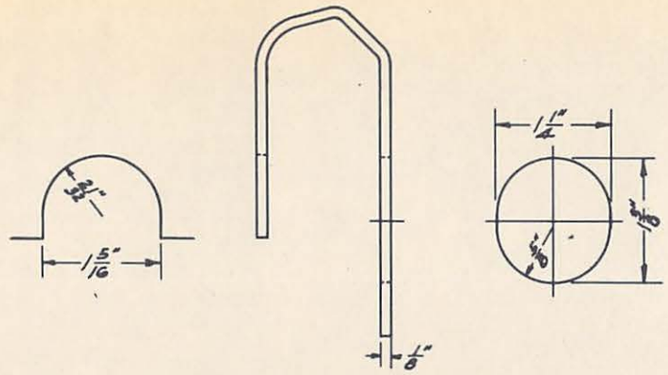
REVISIONS
REV. & REDWN. 1-24-49.
REVISED 2-19-49.
REVISED 3-22-49.
10-6-52

SHEET 2 OF 3 E-573-A

N. & W. RY.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

CONTINUOUS JOINT INSULATION-131-RE, 132-RE AND 140-PS RAIL

ROANOKE, VA. JUNE 22, 1934



END VIEW of FIBER HEAD PIECE
(Fig. 8)

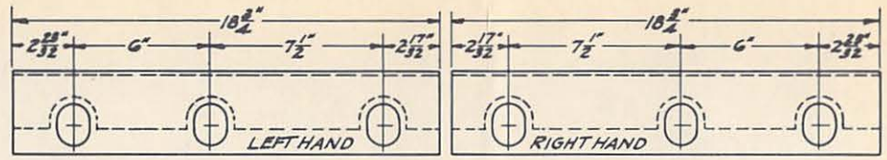


FIG. 8
FIBER HEAD PIECE 1389-G
For 140 P.S. Rail

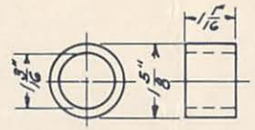


FIG. 10
FIBER BUSHING 7632-F
For 140 P.S. Rail

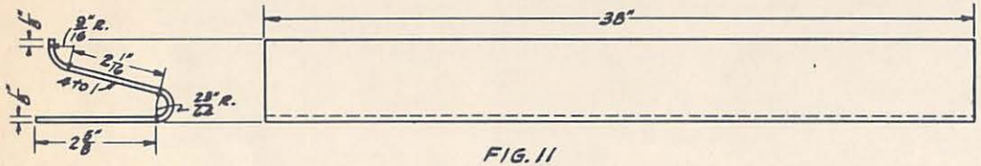


FIG. 11
FIBER BASE PIECE 7/483-P
For 140-P.S. Rail.

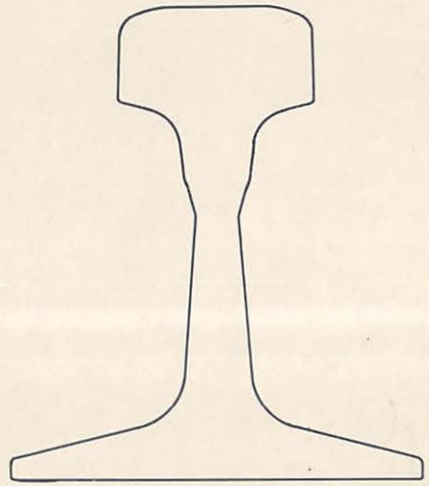


FIG. 9
FIBER END POST
1391 5/8" THICK
For 140 P.S. Rail.

REVISIONS
10-6-52

SHEET 3 OF 3 E-573-A

N. & W. RY.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

CONTINUOUS JOINT INSULATION
131-RE, 132-RE AND 140-PS RAIL

ROANOKE, VA. JUNE 22, 1934

RECEIVED
DEC 19 1952
OHIO. INTER. SECR.

RECEIVED
DEC 19 1952
A.M.
Ansd
Date
MINING DEPT

Items to be furnished by U.S. & S. Co.	
1	L.H. or R.H. A21 Dual Sw. Movt. including–
	1-Point Detector Rod Ass'y. Comp.
	1-Lock Rod Ass'y. Comp.
	1-Front Rod Ass'y. Comp.
	1-R.H. & 1-L.H. Sw. Foot Comp.
	1-Operating Rod & Cage Block Ass'y. Comp.
	1-130 Ohm C.P. Sw. Valve Comp.
	1-6'-3" Tie Strap with lag screws.
	2-2'-4 1/2" Tie Strap with lag screws.
	2-Armored Hose Connections
1	3/4" Pipe Union - Brass to Iron Seat
2	1/2" Pipe Unions - Brass to iron seat
1	3/4" to 1/2" Bushing
11	1/2" Ells
1	1/2" Pet Cock
1	1/2" Street Ell
1	1/2" Close Nipple
3	1/2" X 6" Nipples
1	Air Strainer
2	3/4" Street Ells
1	1/2" X 8" Nipple
1	3/4" X 6" "

Items to be furnished by N. & W. Ry.	
2	7" X 9" X 12' Ties, Fig. 4
1	U-Box (Pipe Housing)
1	C.P. Valve Foundation
1	Cover for U-Box, Fig. 3.
4	1/2" X 10" Anchor bolts with nut and washer
4	1/2" X 5" Anchor bolts with nut and washer
1	1 1/4" X 24" Flex. Conduit
1	1 1/4" Squeeze Connectors
1	Raco Riser No 464-2
2	Insulating Fibers, Fig. 1.
2	Switch Padlocks
2	Signal Padlocks
2	Morden Gauge Plates Comp. with drive lag screws for __# Rail
2	Morden Slide Plates Comp. with drive lag screws for __# Rail
6	Morden Adjustable Rail Braces for __# Rail
–	Necessary X-heavy, 1/2" Pipe for location.
1	Tie Strap 1/2" X 2" X 2'-5"
2	Drive lag screws, 1/2" X 4 1/2"
1	U-Bolt complete, Fig. 6.

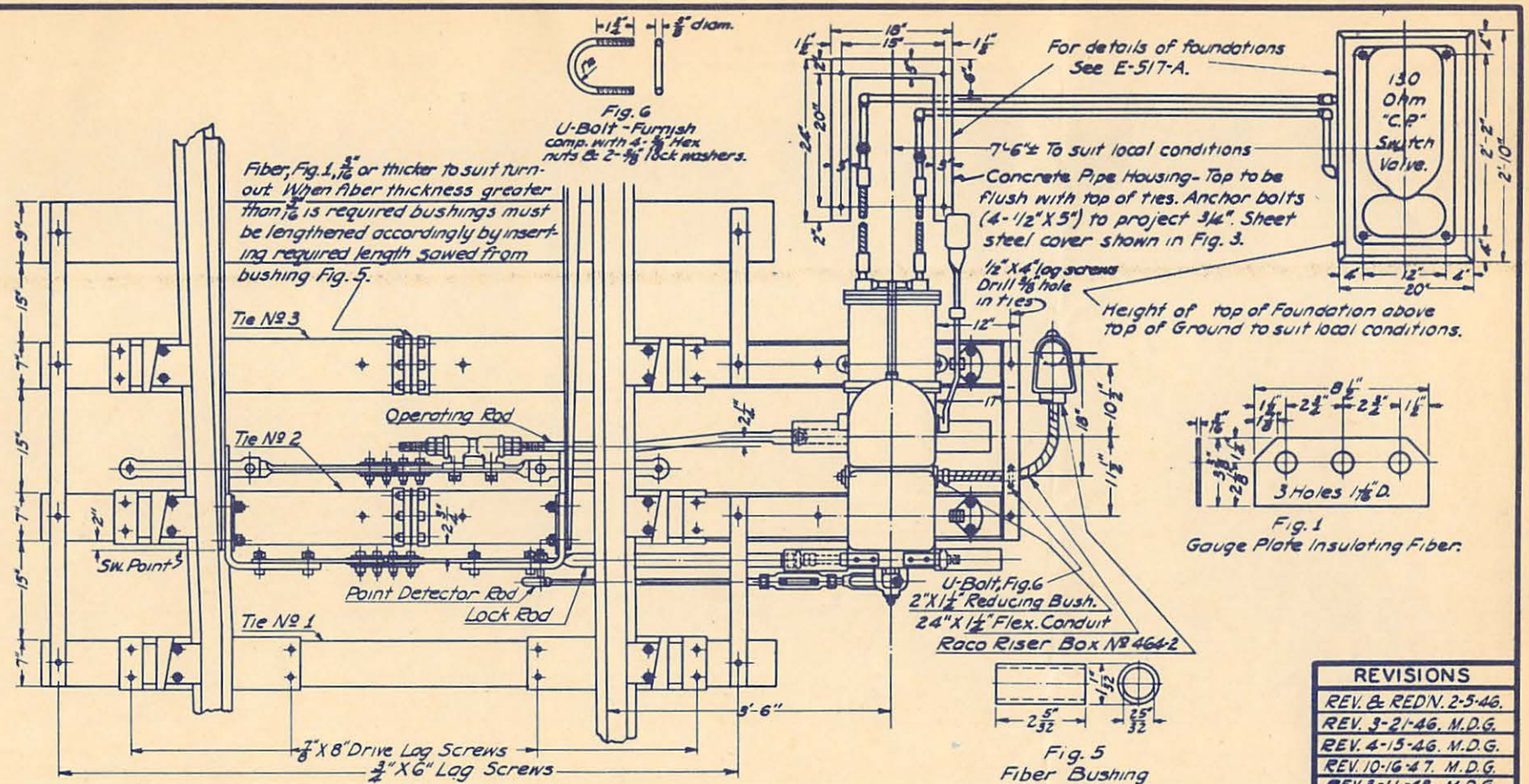
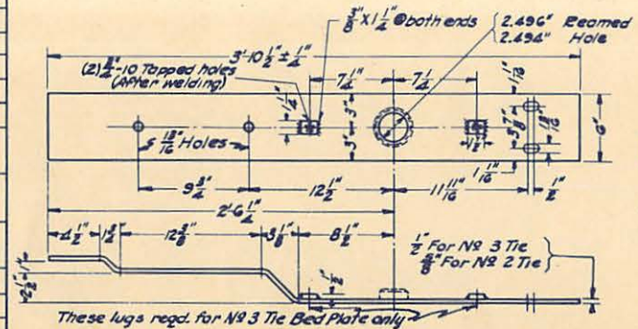

Fiber, Fig. 1, 5/16" or thicker to suit turnout. When fiber thickness greater than 5/16" is required bushings must be lengthened accordingly by inserting required length sawed from bushing Fig. 5.
Tie No 3
Tie No 2
Tie No 1
Operating Rod
Point Detector Rod
Lock Rod
Sw. Points
2"
2 1/4"
2 3/4"
5'-6"
7/8" X 8" Drive Lag Screws
3/4" X 6" Lag Screws
For details of foundations See E-517-A.
130 Ohm "C.P." Switch Valve.
7'-6" ± To suit local conditions
Concrete Pipe Housing- Top to be flush with top of ties. Anchor bolts (4-1/2" X 5") to project 3/4". Sheet steel cover shown in Fig. 3.
1/2" X 4" lag screws Drill 5/8" hole in ties
Height of top of Foundation above top of Ground to suit local conditions.
U-Bolt, Fig. 6
2" X 1 1/4" Reducing Bush.
24" X 1 1/4" Flex. Conduit
Raco Riser Box No 464-2
2 5/32"
25/32"

Fig. 6
U-Bolt - Furnish comp. with 4- 5/8 Hex nuts & 2- 5/8 lock washers.

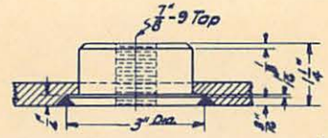
Fig. 1
Gauge Plate Insulating Fiber.

Fig. 5
Fiber Bushing

Fig. 4.
Framing of 7" X 9" X 12'-0" Ties No 2 & 3.



Bed Plate as used with Morden Gauge Plates.
Fig. 2.



Enlarged View of Dowel.
Press in Plate and Weld all around on bottom.

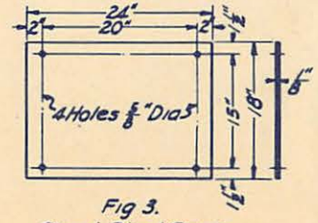


Fig 3.
Sheet Steel Cover for Pipe Housing.

REVISIONS
REV. & REDN. 2-5-46.
REV. 3-21-46. M.D.G.
REV. 4-15-46. M.D.G.
REV. 10-16-47. M.D.G.
REV. 3-11-48. M.D.G.
REV. 7-16-48. M.D.G.
REV. 6-2-49. M.D.G.

ONE SHEET E-591-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT. STYLE A21 E.P. SWITCH MOVEMENT

ROANOKE, VA. JUL. 7. 1936

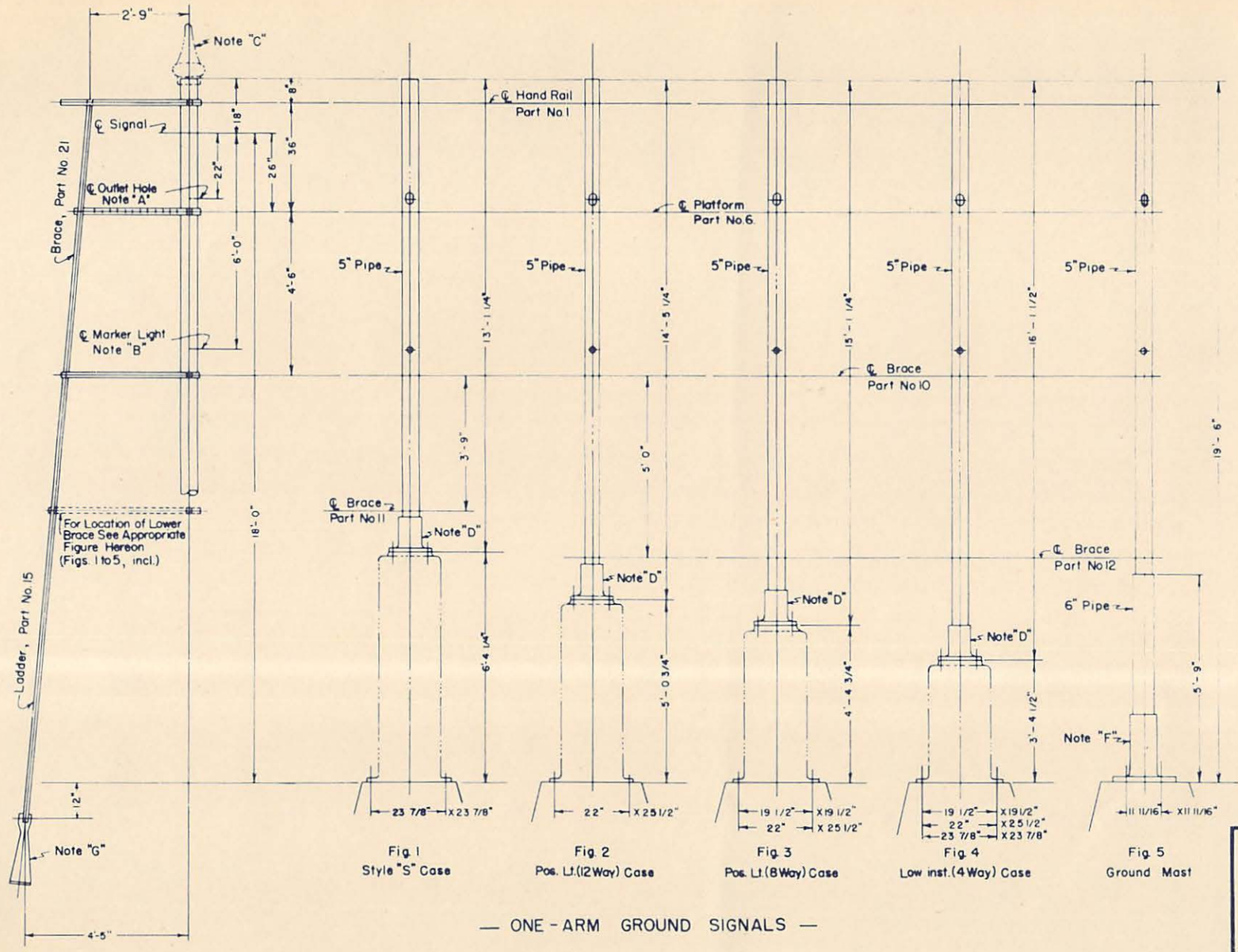


Fig. 1 Style "S" Case

Fig. 2 Pos. Lt. (12 Way) Case

Fig. 3 Pos. Lt. (8 Way) Case

Fig. 4 Low inst. (4 Way) Case

Fig. 5 Ground Mast

LADDER ARRANGEMENT

For all one-arm ground signals

— ONE-ARM GROUND SIGNALS —

For Note References And Part Numbers See Sheets 5 and 6

REVISIONS
REDRAWN OCT 14, 1946 LDG

SHEET 1 OF 6 E 635-A

N & W RY.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

POSITION LIGHT SIGNALS

ROANOKE, VA. FEB. 1, 1939

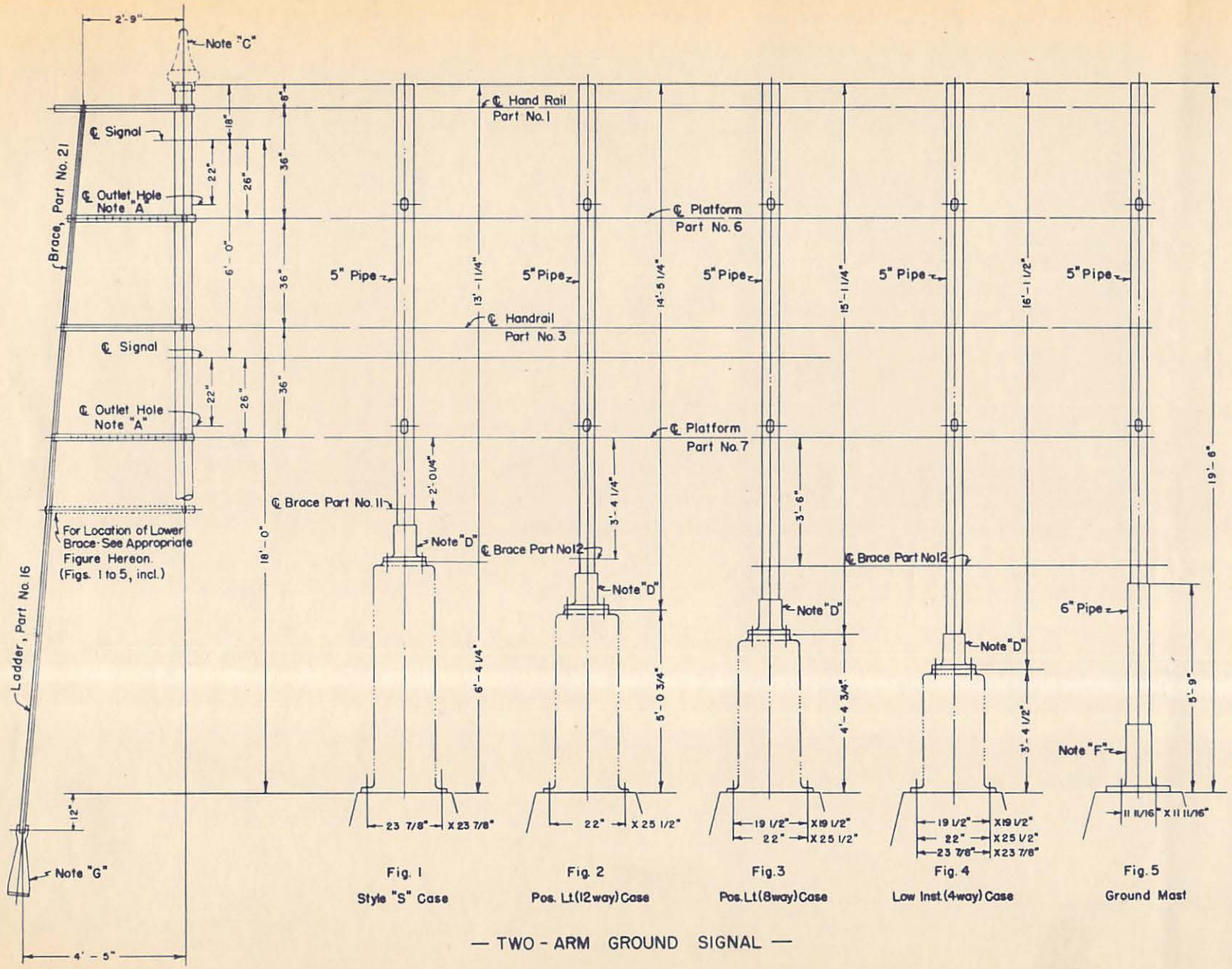


Fig. 1 Style "S" Case

Fig. 2 Pos. Lt. (12 way) Case

Fig. 3 Pos. Lt. (8 way) Case

Fig. 4 Low Inst. (4 way) Case

Fig. 5 Ground Mast

LADDER ARRANGEMENT
For All Two-Arm Ground Signals

— TWO - ARM GROUND SIGNAL —

For Note References And Part Numbers See Sheets 5 and 6

REVISIONS		
REDRAWN	OCT. 15, 1946	LDG
REVISED	4-2-51	M.D.G

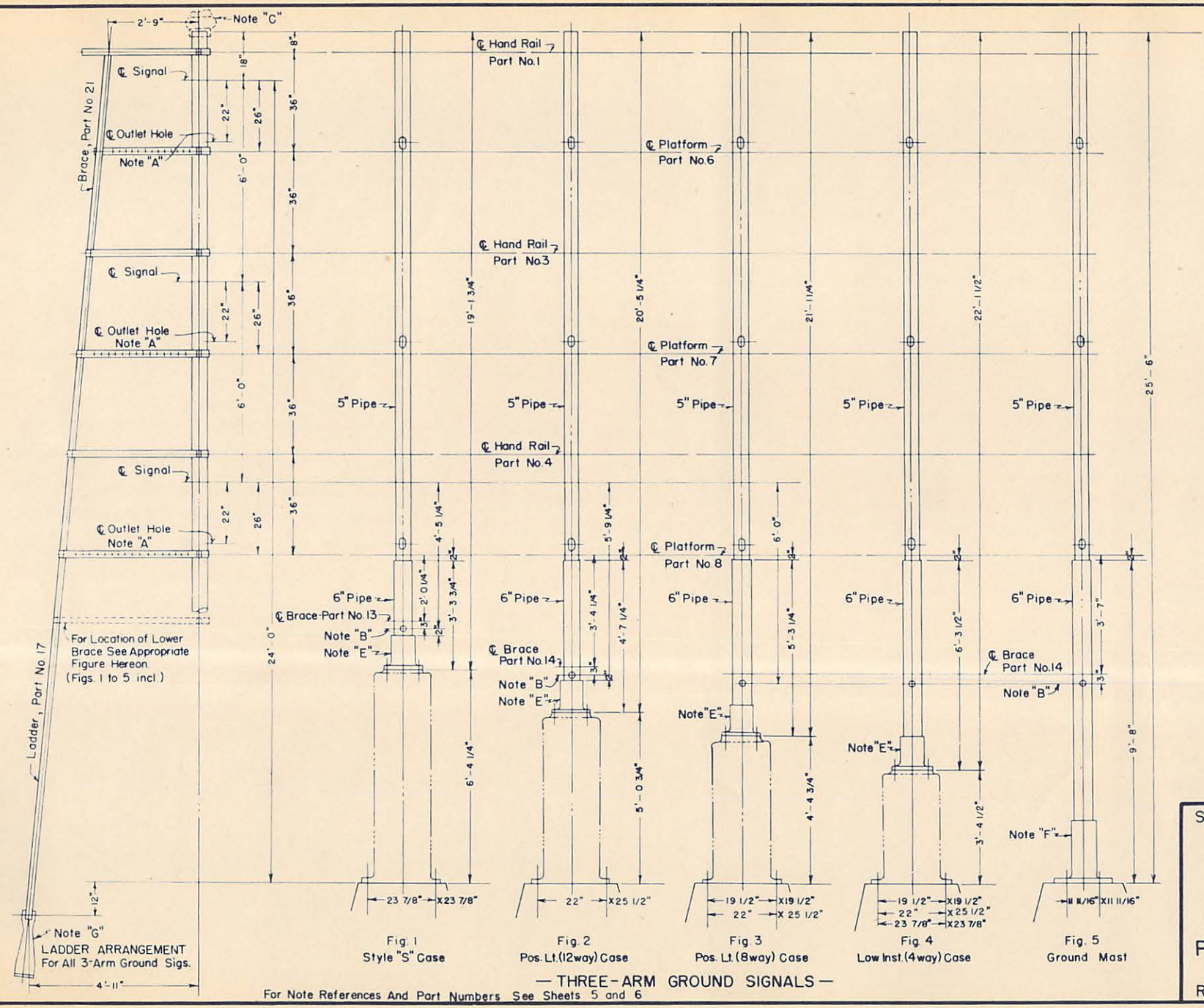
SHEET 2 OF 6 E 635-A

N & W RY.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

POSITION LIGHT SIGNALS

ROANOKE, VA. FEB. 1, 1939



— THREE-ARM GROUND SIGNALS —

For Note References And Part Numbers See Sheets 5 and 6

REVISIONS

REDRAWN OCT 16, 1946 LDG

SHEET 3 OF 6 E635-A

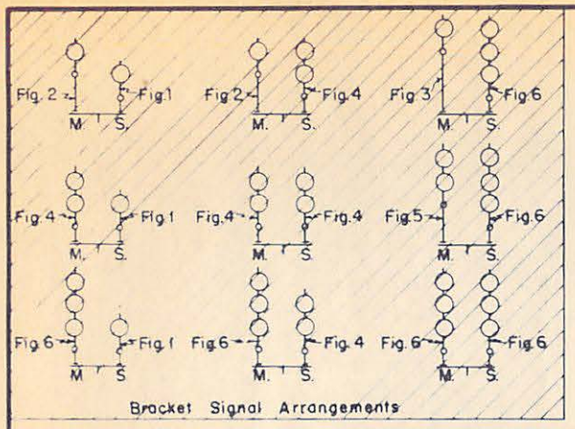
N & W RY.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

POSITION LIGHT SIGNALS

ROANOKE, VA. FEB. 1, 1939

NAVY DEPT.
RECEIVED
DEC 26 1946
SPECIFICATIONS



Bracket Signal Arrangements

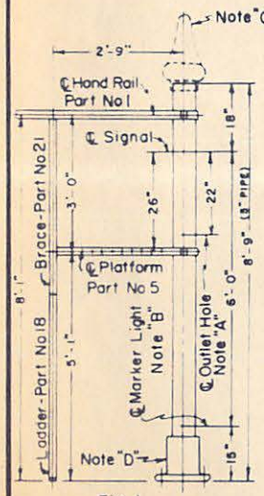


Fig 1
One-Arm Signal

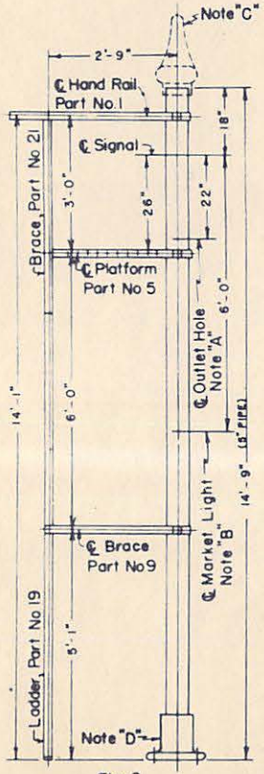


Fig. 2
One-Arm Signal

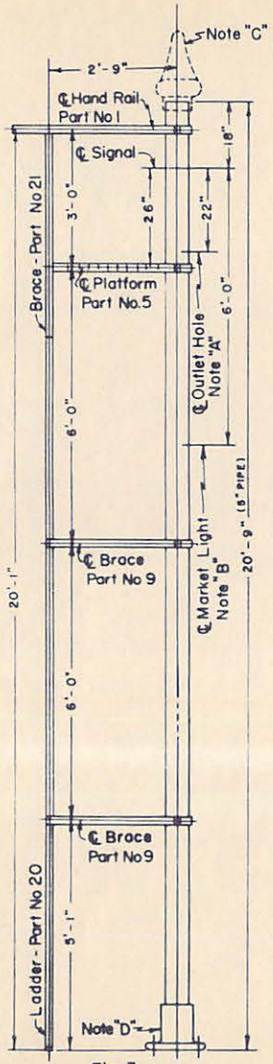


Fig. 3
One-Arm Signal

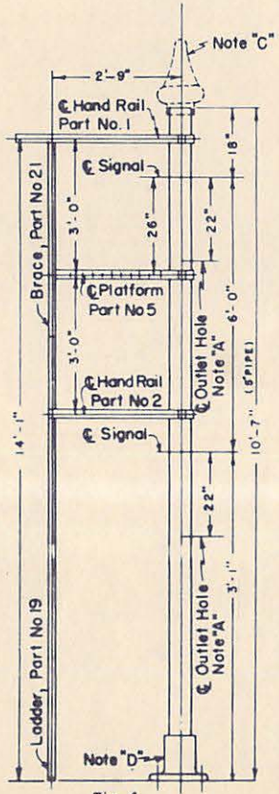


Fig. 4
Two-Arm Signal

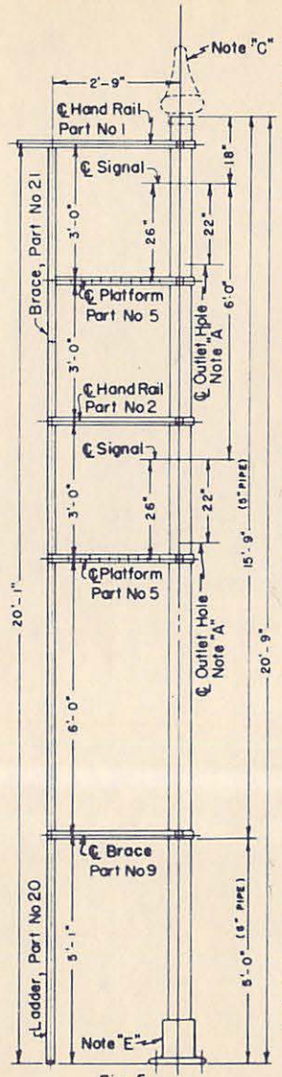


Fig. 5
Two-Arm Signal

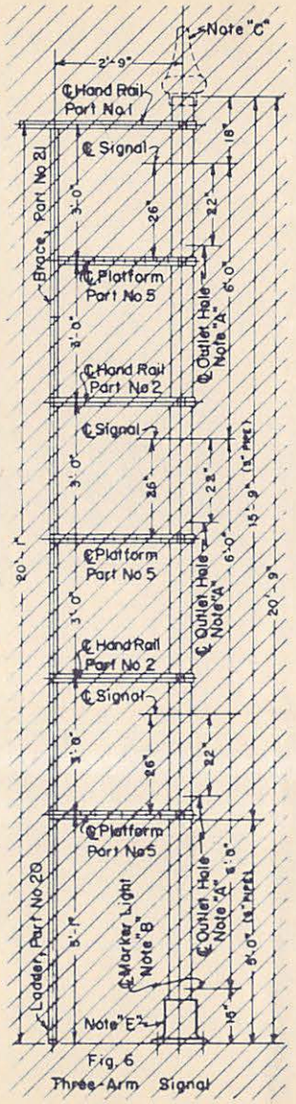


Fig. 6
Three-Arm Signal

— BRIDGE AND BRACKET SIGNALS —

Note - When Marker Light Is Not Used, Other Dimensions Are Not Changed

For Note References & Part Numbers See Sheets 5 and 6

On All Base Castings Hereon, Bolt Spacing Is 8 1/2" X 8 1/2" (i.e. 12" diam. bolt circle)

REVISIONS		
REDRAWN	OCT 18, 1946	LDG
REVISED	4-2-51	MDG

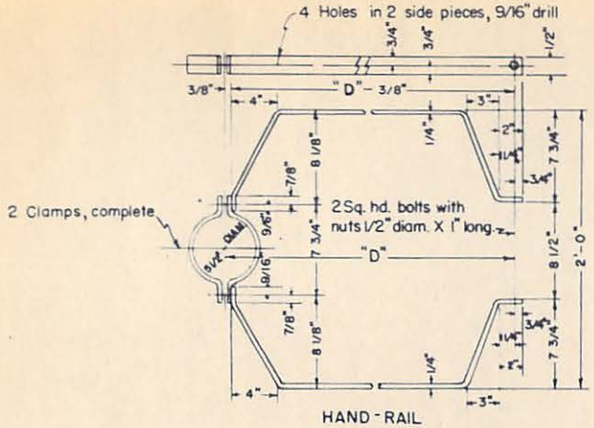
SHEET 4 OF 6 E 635-A

N & W RY.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

POSITION LIGHT SIGNALS

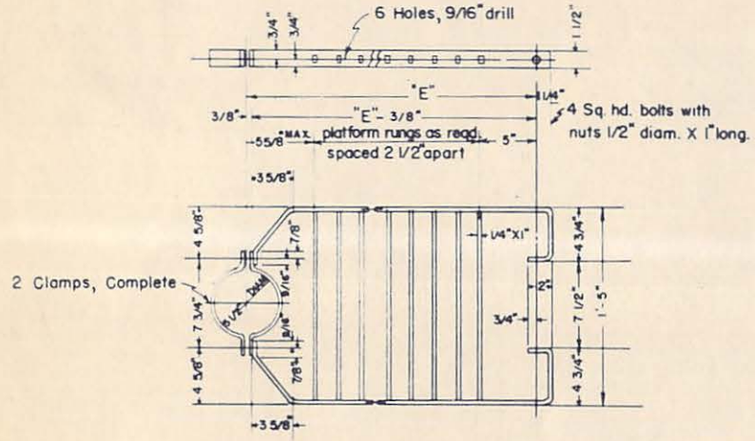
ROANOKE, VA. FEB. 1, 1939



HAND - RAIL

O.H. Steel - Complete as shown

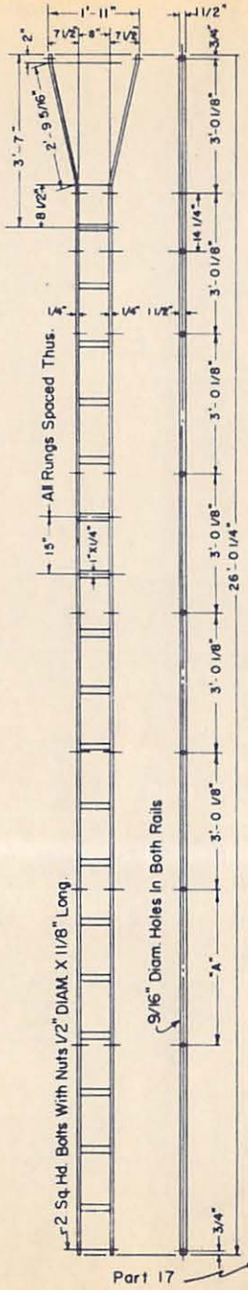
Part No	"D"
2	2'-9"
3	3'-3"
4	3'-9"



PLATFORM

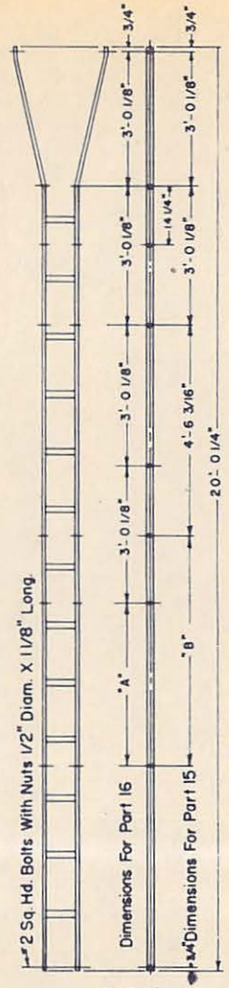
O.H. Steel - Complete as shown

Part No	"E"
5	2'-9"
6	3'-0"
7	3'-6"
8	4'-0"



Part 17

SHEET NO	FIG. NO	"A"
3	1	2'-0 1/4"
3	2	3'-4 1/4"
3	3-4-5	3'-7"

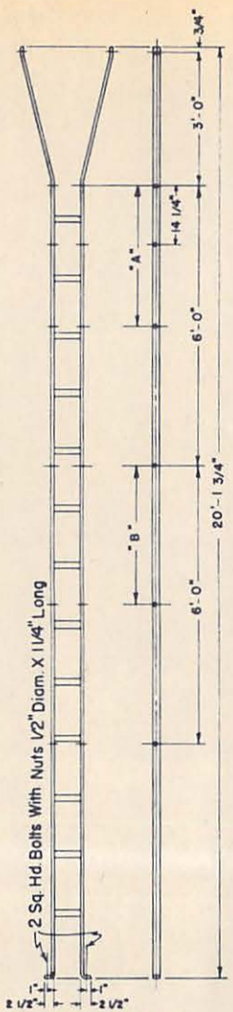


Part 16

SHEET NO	FIG. NO	"A"
2	1	2'-0 1/4"
2	2	3'-4 1/4"
2	3-4-5	3'-7"

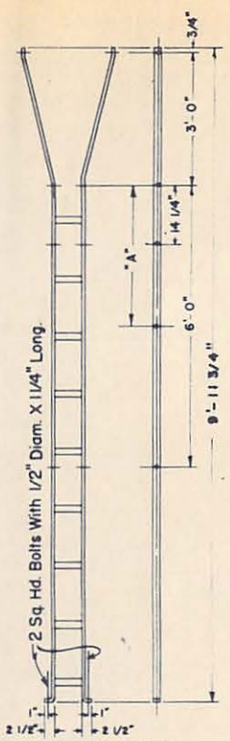
Part 15

SHEET NO	FIG. NO	"B"
1	1	3'-9
1	2-3-4-5	5'-0"



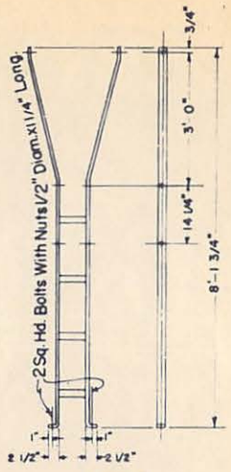
Part 20

SHEET NO	FIG. NO	"A"	"B"
4	3	—	—
4	5	3'-0"	—
4	6	3'-0"	3'-0"



Part 19

SHEET NO	FIG. NO	"A"
4	2	—
4	4	3'-0"



Part 18
(Sheet No 4, Fig. No 1)

LADDERS — O.H. STEEL

Dimensions for each ladder same as for ladder part 17, except for length and drilling of rails as shown. — Each complete with 2 braces, part 21, and platforms, hand rails and braces as detailed hereon and as shown in assembly views on sheets 1, 2 and 3 of this drawing.

REVISIONS

REDRAWN OCT 19, 1946 LDG
REVISED 4-2-51 M.D.G

SHEET 5 OF 6 E 635-A

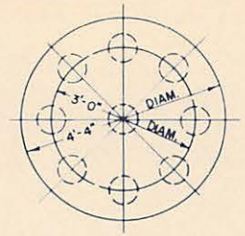
N & W RY.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

POSITION LIGHT SIGNALS

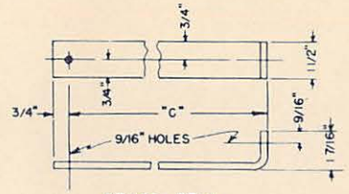
ROANOKE, VA. FEB. 1, 1939

E 635-A



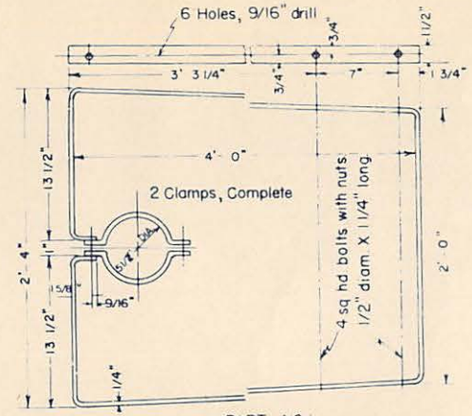
SIGNAL BACKGROUND

18 Gage sheet steel — Paint black all over. — Holes as required.

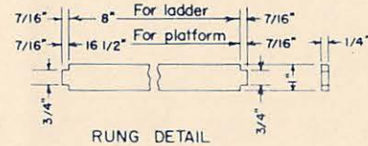


BRACE STAY

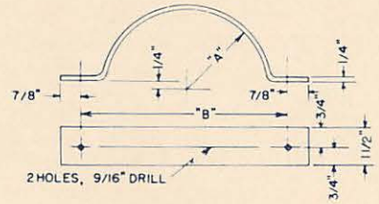
2 thus per brace - O.H. Steel
Each pair complete with two sq. head bolts with nuts, 1/2" diam. X 1" long.



PART NO 1
TOP HAND RAIL, O.H. Steel
Complete as shown



RUNG DETAIL
O.H. Steel



BRACE CLAMP

O. H. Steel - 2 thus per brace
Each pair complete with 2 sq. hd. bolts with nuts, 1/2" diam. X 1 3/4" long.

NOTES (References for sheets 1, 2, 3 & 4)

"A" — For type PL1 fitting, cut 2" diam. hole.
For type PL2 fitting, cut 1 7/8" X 4 1/8" oblong hole with 15/16" radius at top and bottom ends.

"B" — When marker light is required, cut 2" diam. hole.

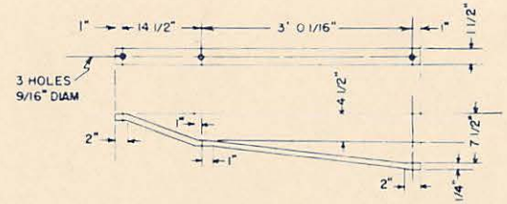
"C" — Pinnacle for 5" pipe - U.S.S.& S.Co plate B-2443, piece No 68566, drawing B-8121-11

"D" — Base for 5" pipe - U.S.S.& S.Co plate B2580, piece No T-115264, drawing C-3231-2 — N & W drawing No. E 677.

"E" — Base for 6" pipe - U.S.S.& S.Co. piece No 90544, drawing C-3231-1.

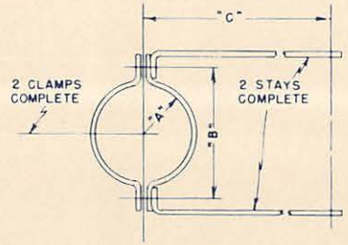
"F" — Base for "6" pipe - N.& W drawing No E-552

"G" — Ladder foundation - A.A.R No 1052! - U.S.S.& S.Co. plate B-2586, piece No. 181370, drawing B 8848-10



PART 21

BRACE - O.H. Steel
Each complete with 2 sq hd bolts with nuts 1/2" diam. X 1" long.



BRACE

Complete as shown

Part No.	A	B	C
9	2 3/4"	7 3/4"	2'- 9"
10			3'- 4 1/2"
11			3'- 8 1/8"
12			3'- 9 1/2"
13	3 5/16"	8 7/8"	4'- 2 1/8"
14			4'- 3 1/2"

REVISIONS

REDRAWN OCT 23, 1946	LDG

SHEET 6 OF 6 E 635-A

N & W RY.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

POSITION LIGHT SIGNALS

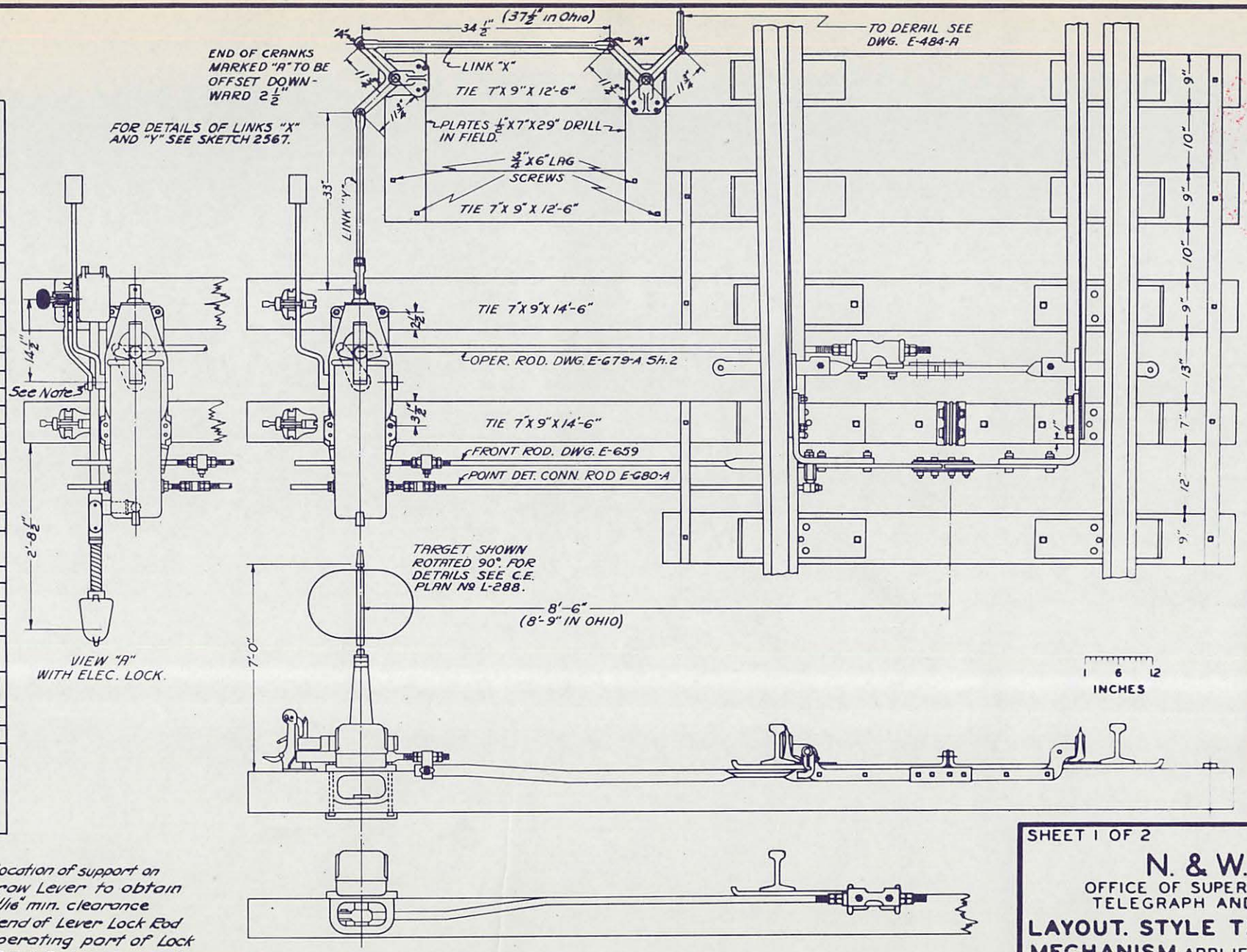
ROANOKE, VA. FEB. 1, 1939

SPECIFICATION DEPT.
RECEIVED
DEC
26
1946

To be furnished by U.S.&S.Co. - RH or LH T21 switch mechanism for applying to 131# R.E. rail, single switch with SL-21A electric lock.	
1	T21 Sw. Mech with high stand
1	Target, N&W Std. yellow, comp. with bolts, nuts & lock washers.
1	9 7/8" Angle washer.
1	12 1/4" Angle washer.
1	Lever Latch Stand, less lag screws
1	Sw. Point adjusting block.
1	Oper. Rod 8'-5 3/4" long, comp. with pin and cotter.
1	Lock Rod
1	Lock Rod connecting lug.
1	Point Detector Rod.
1	Pt. Det Connecting Rod
1	Pt. Det Rod Stud, comp.
1	Front Rod, comp.
1	L.H. Sw. Foot with point bolts
1	R.H. Sw. Foot with point bolts.
1	SL21A Elec. Lock with lever lock rod & crank, less lag screws.
1	1 1/4" Conduit system.

Items below furnished by R.R.	
1	1/2" X 2 1/2" X 7'-3" Tie Strap.
2	1/2" X 2 1/2" X 2'-4" Tie Strap.
13	3/4" X 6" Lag screws.
2	3/4" X 9" Bolts (Comp. with nuts and
2	3/4" X 11" Bolts lock washers)
1	Raco Term. Box #464-1, 8 way or #464-2, 12 way
1	1 1/4" X 12" Flex. conduit
2	7" X 9" X 14'-6" treated oak ties.

Gauge plates, rail braces, derail connections and 12'-6" ties must be ordered seperately as required.


34 1/2" (37 1/2" in Ohio)
END OF CRANKS MARKED "A" TO BE OFFSET DOWN-WARD 2 1/2"
FOR DETAILS OF LINKS "X" AND "Y" SEE SKETCH 2567.
LINK "X"
TIE 7"X 9"X 12'-6"
PLATES 1/2"X7"X29" DRILL IN FIELD.
3/4"X6" LAG SCREWS
TIE 7"X 9" X 12'-6"
LINK "Y"
33"
TIE 7"X 9"X 14'-6"
OPER. ROD. DWG. E-679-A Sh. 2
TIE 7"X 9"X 14'-6"
FRONT ROD. DWG. E-659
POINT DET. CONN. ROD E-680-A
TO DERAIL SEE DWG. E-484-A
14 1/2"
See Note 3
2'-8 1/2"
VIEW "A" WITH ELEC. LOCK.
TARGET SHOWN ROTATED 90° FOR DETAILS SEE C.E. PLAN No L-288.
8'-6" (8'-9" IN OHIO)
7'-0"
1 6 12
INCHES

Note-
Adjust location of support on Hand-Throw Lever to obtain 1/8" max., 1/16" min. clearance between end of Lever Lock Rod and co-operating part of Lock Pedal. Pivot Bolt in support should be 3/4" max., 1/2" min. from center of Hand-Throw Lever Shaft.

REVISIONS
REV. & REDR. 5-34
RE. 5-8-45 W.G.
RE. 12-30-46 W.J.B.
RE. 5-8-47 W.J.J.
REV. 11-3-47 W.J.B.
RE. 12-15-53 W.J.J.

SHEET 1 OF 2 E-637-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT. STYLE T20 & T21 SW. MECHANISM APPLIED TO SWITCHES AND DERAILS. HIGH STAND.

ROANOKE, VA. MAR. 6, 1939

P-FILE NO. 1648

RECEIVED
NOV 2 1953
ORD

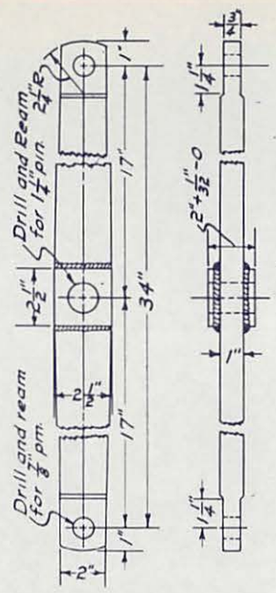
To be furnished by U.S.&S.Co.– RH.or L.H. T21 switch mechanism for applying to 131# R.E rail, single switch, with SL-21A electric lock.

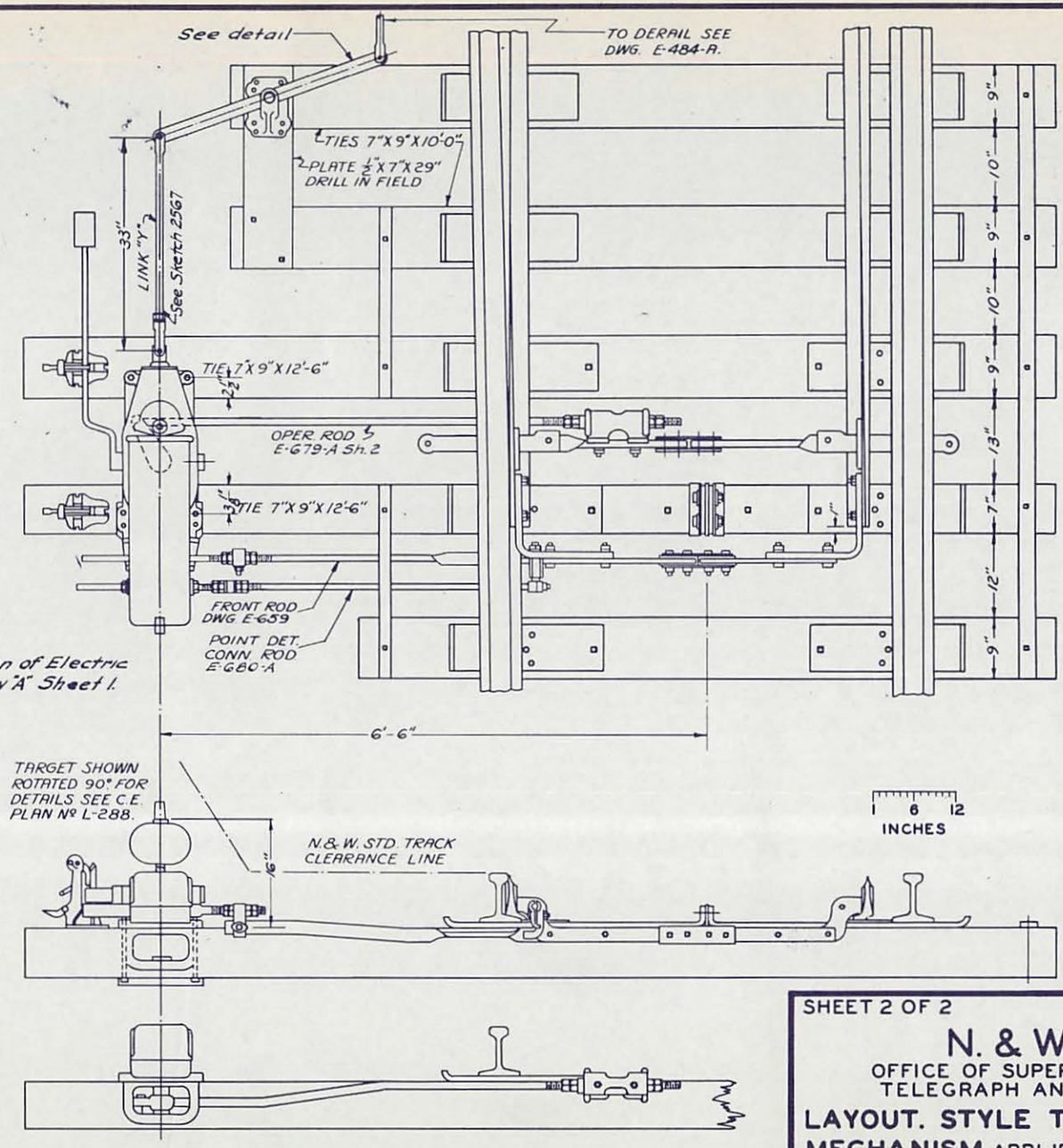
1	T21 Sw.Mech. with low stand.
1	Target, N&W Std. yellow, comp. with bolts, nuts & lock washers.
1	9 7/8" Angle washer.
1	12 1/4" Angle washer.
1	Lever Latch Stand, less lag screws
1	Sw. Point adjusting block.
1	Oper. Rod 6'-5 3/4" long, comp. with pin and cotter.
1	Lock Rod
1	Lock Rod connecting lug.
1	Point Detector Rod
1	Pt. Det. Connecting Rod
1	Pt Det Rod Stud, comp.
1	Front Rod, comp.
1	L.H. Sw Foot with point bolts
1	R.H. Sw Foot with point bolts
1	SL21A Elec Lock with lever lock rod & crank, less lag screws
1	1 1/4" Conduit system.

Items below furnished by R.R.

1	1/2" X 2 1/2" X 7'-3" Tie Strap.
2	1/2" X 2 1/2" X 2'-4" Tie Strap
11	3/4" X 6" Lag screws.
2	3/4" X 9" Bolts (Comp with nuts and
2	3/4" X 11" Bolts lock washers)
1	Raco Term. Box # 464-1, 8 way or # 464-2, 12 way
1	1 1/4" X 12" Flex. conduit
2	7" X 9" X 12'-6" treated oak ties

Gauge plates, rail braces, derail connections and 10'-0" ties must be ordered seperately as required.





Note-
For application of Electric Lock see View "A" Sheet 1.

REVISIONS	
REV. & RED'N. 11-23-44.	
REV. 5-18-45.	M.D.G.
REV. 1-30-46.	M.D.G.
REV. 5-18-46.	M.D.G.
REV. 6-13-50	M.D.G.
REV. 10-, -53	M.D.G.

SHEET 2 OF 2 E-637-A

N. & W. Ry.

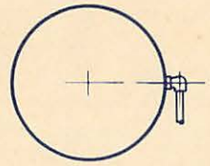
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

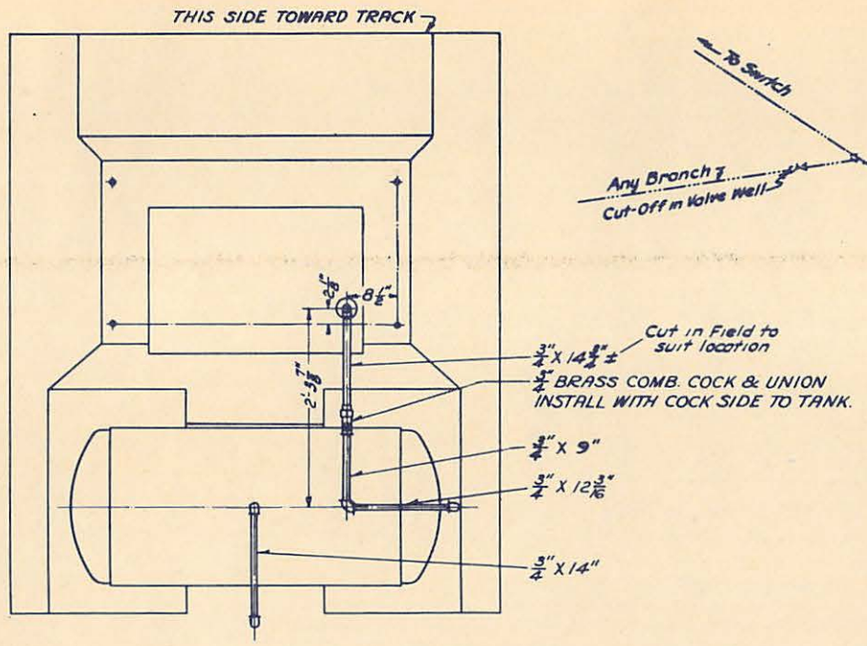
LAYOUT. STYLE T20 & T21 SW. MECHANISM APPLIED TO SWITCHES AND DERAILS. LOW. STAND.

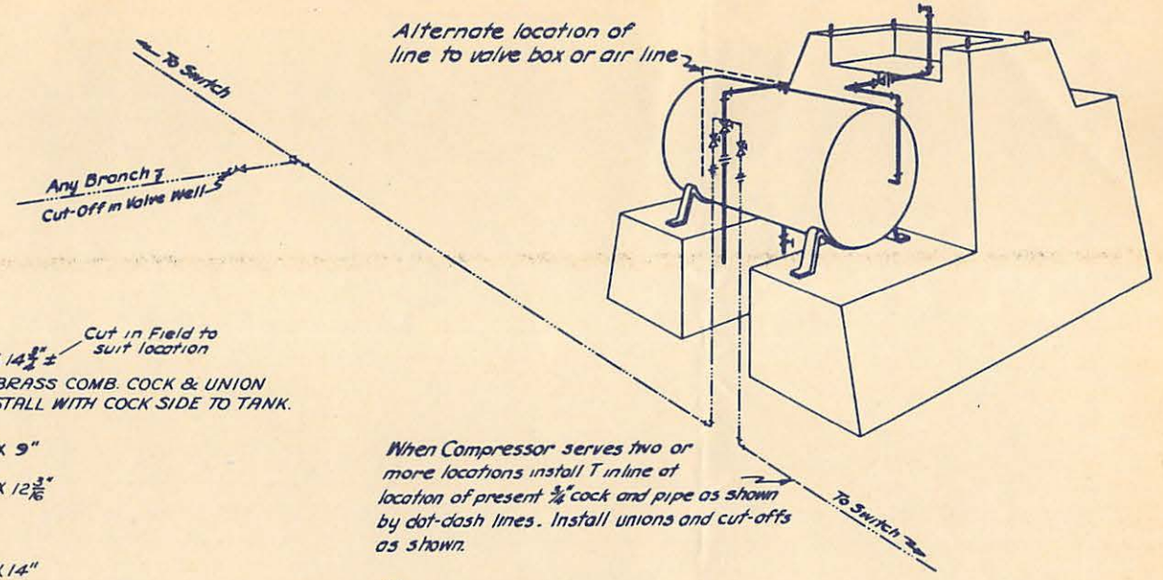
ROANOKE. VA. MAR. 6. 1939

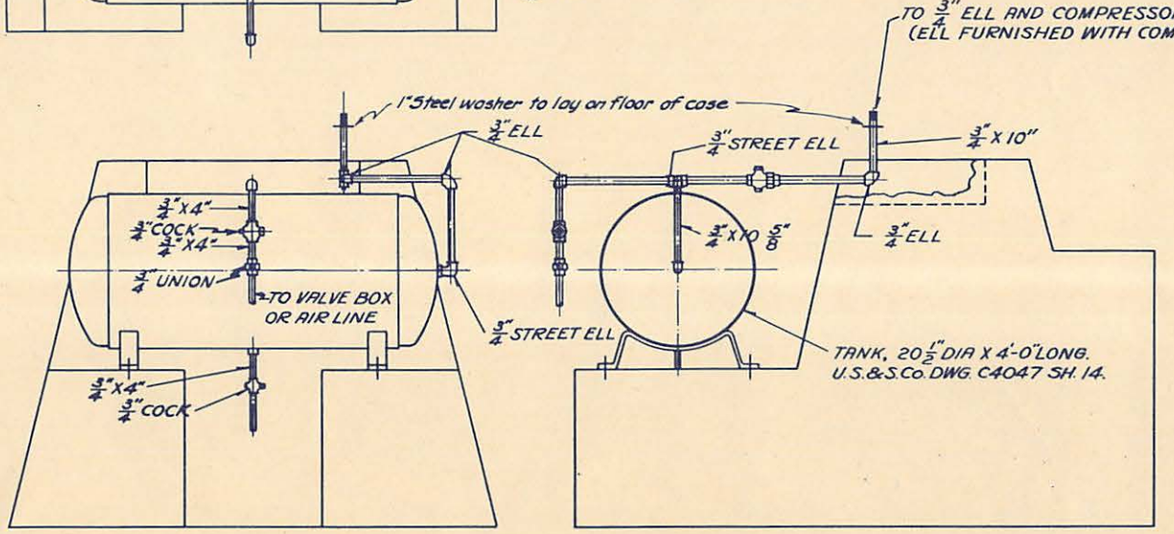
P-FILE NO. 1648

RECEIVED
NOV 2 1953
OKLA. INTER. SERV.






To Switch
Any Branch
Cut-Off in Valve Well
Alternate location of line to valve box or air line
When Compressor serves two or more locations install T in line at location of present ¾" cock and pipe as shown by dot-dash lines. Install unions and cut-offs as shown.
To Switch


TO ¾" ELL AND COMPRESSOR - (ELL FURNISHED WITH COMP.)
1" Steel washer to lay on floor of case
¾" ELL
¾" STREET ELL
¾" X 10"
¾" X 4"
¾" COCK
¾" X 4"
¾" UNION
TO VALVE BOX OR AIR LINE
¾" X 10 5/8"
¾" ELL
¾" STREET ELL
TANK, 20½" DIA X 4'-0" LONG. U.S.&S.Co. DWG. C4047 SH. 14.
¾" X 4"
¾" COCK

LIST OF MATERIAL		
NO. PIECES		
1	E.P. Compr. Unit (2-4.2 cu.ft. Type "G" Comprs. With Case) U.S.& S.Co. Pce. No 273237-C1G774.	
1	TANK 20 1/2" D. X 4'-0" LONG U.S.& S.CO. DWG. C4047 SH. 14.	
3	3/4" X 4"	NIPPLES GALV.
1	3/4" X 10"	PIPE "
1	3/4" X 9"	" "
1	3/4" X 10 5/8"	" "
1	3/4" X 12 3/16"	" "
1	3/4" X 14"	" "
1	3/4" X 17"	" "
2	3/4" STREET ELLS	"
4	3/4" ELLS	"
1	3/4" R.R. UNION BRASS TO IRON SEAT	
2	3/4" STD. BRASS STEAM COCK	
1	3/4" BR. COMB COCK & UNION	

NOTE:
EACH PIPE MUST BE MADE FREE OF DIRT AND SCALE BEFORE ASSEMBLING IN FIELD AND THE COMPLETE ASSEMBLY BLOWN OUT THOROUGHLY TO PREVENT STICKING OF VALVES.

REVISIONS
REV. & REDN 10-24-44 M.D.G.
REVISED 3-30-46 M.D.G.
REVISED 4-15-46. M.D.G.
REVISED 3-9-48. M.D.G.
REVISED 10-27-48 M.D.G.
REVISED 4-27-49 M.D.G.
REVISED 6-25-49 M.D.G.

0 6 12 INCHES

SHEET 1 OF 2 E-641-A

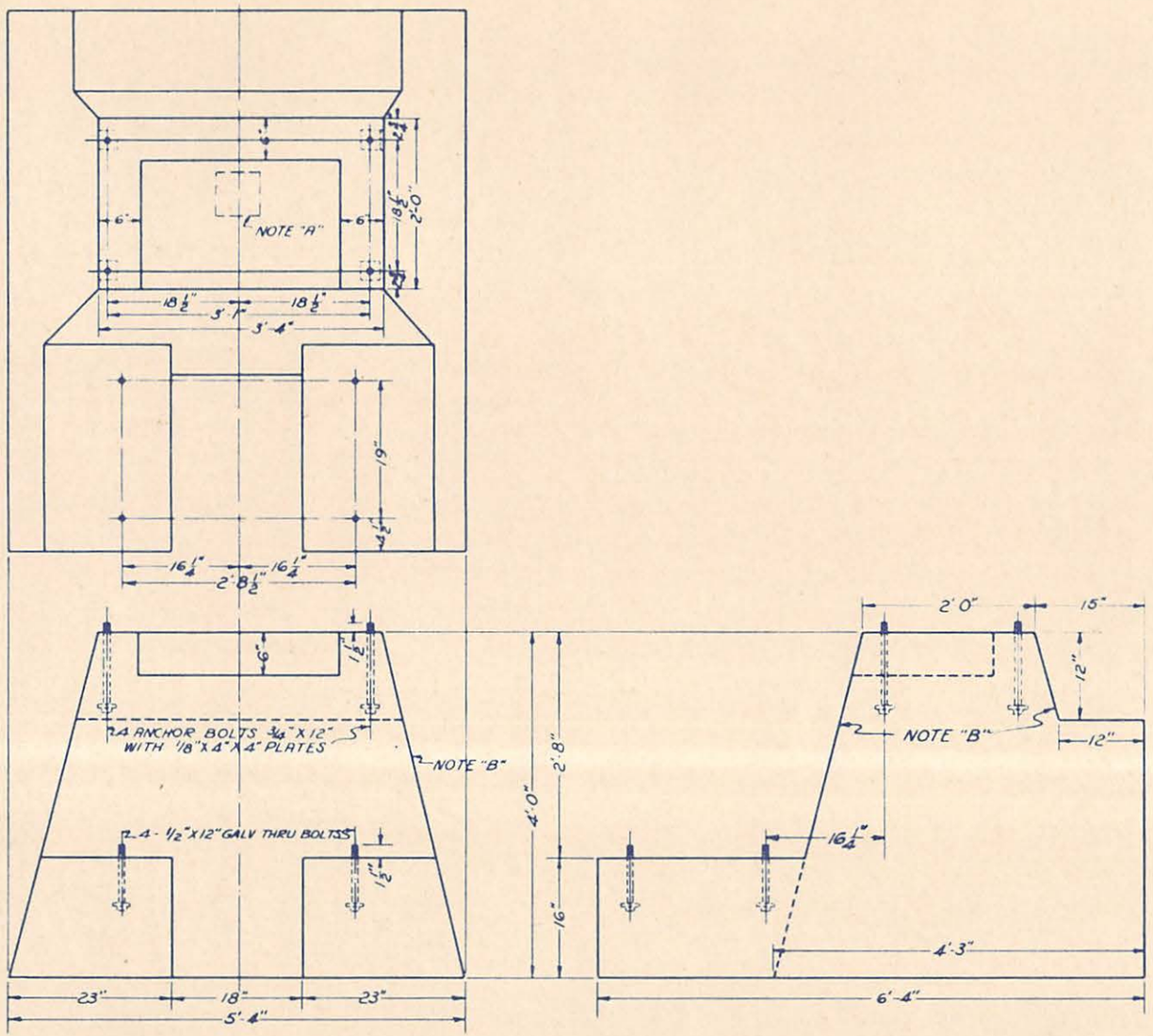
N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

AIR COMPRESSOR, INSTALLATION DETAILS

ROANOKE, VA. OCT. 24, 1944

MATERIAL LIST	
4	Yds Stone
2	Yds Sand
27	Bags Cement
4	Thru Bolts 1/2" X 12" comp. with Nut & Sq Washer, Galv.
4	Anchor Bolts 3/4" X 12"
4	Nuts 3/4"
4	Plate Washers - 3/4"
4	Steel Plates - 1/8" X 4" X 4" With 13/16" Hole on ℄



NOTES

"A" LEAD IN OPENING SIZE, LOCATION AND DIRECTION TO SUIT LOCAL REQUIREMENTS.

"B" ALL BATTER 3" IN 12"

REVISIONS
REV & REDN 12-18-44 W.J.S.
REVISED 5-11-45 W.J.S.
REVISED 3-30-46 W.J.S.

0 6 12
INCHES

SHEET 2 OF 2 E-641-A

N. & W. Ry.

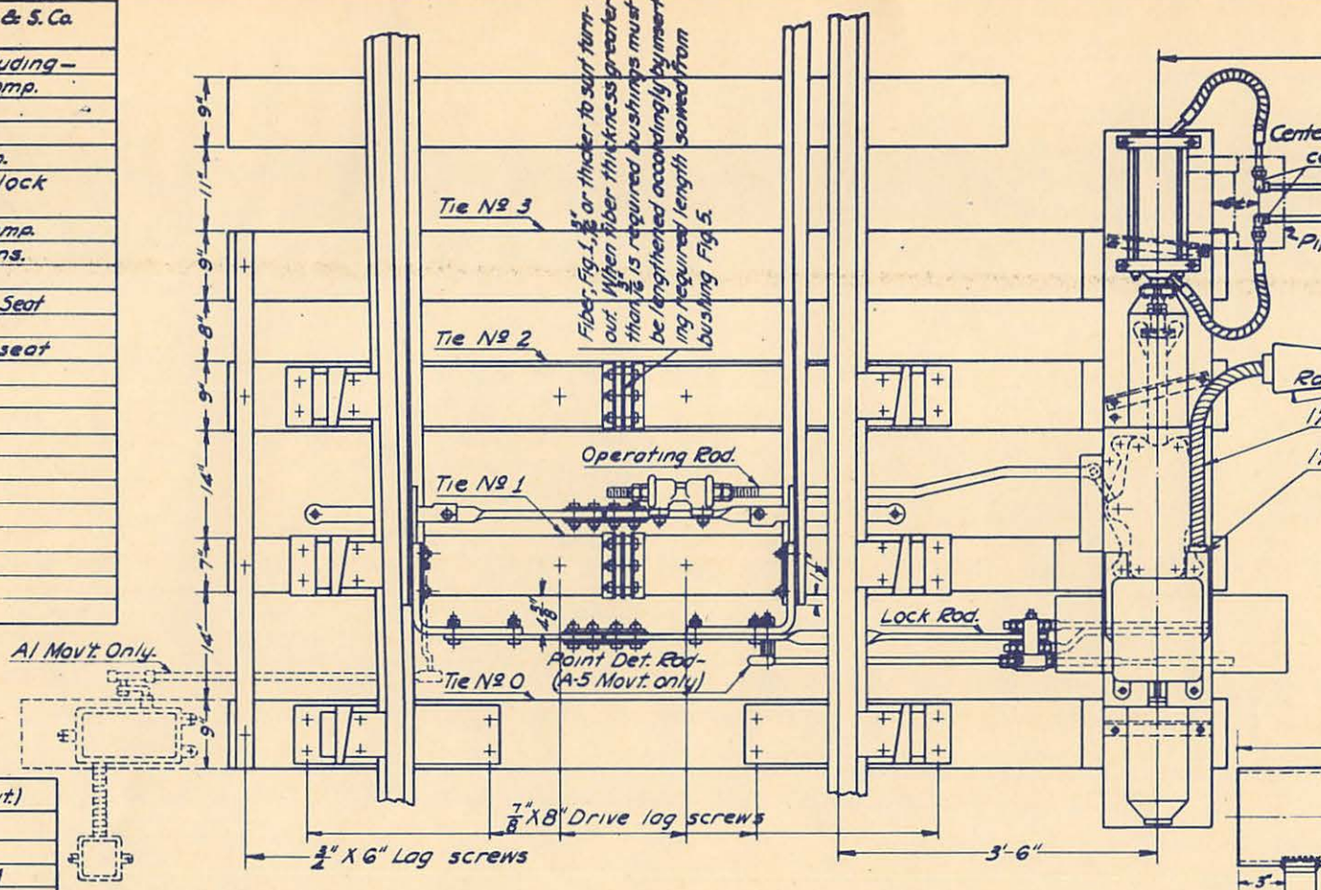
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

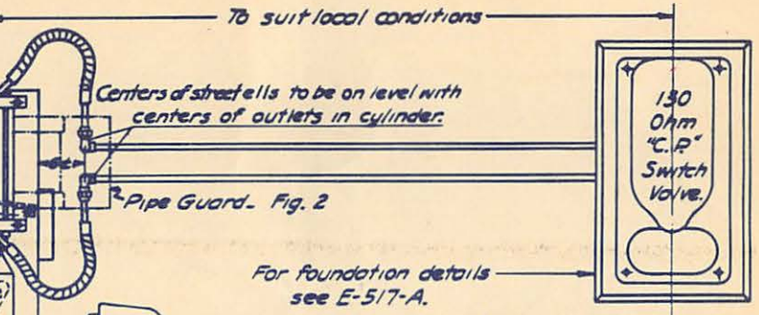
AIR COMPRESSOR.
FOUNDATION.

ROANOKE, VA. DEC. 18, 1944

Items to be furnished by U.S.& S.Co. (for A5 Movt.)	
1	L.H. or R.H. A5 Sw. Movt., including –
	1-Point detector rod ass'y. comp.
	1-Lock rod ass'y. comp.
	1-Front rod ass'y. comp.
	1-R.H. & 1-L.H. sw. foot comp.
	1-Operating rod & cage block ass'y. comp.
	1-130 Ohm C.P. Sw. valve comp.
	2-Armored hose connections.
1	3/4" Pipe Union - Brass to Iron Seat
1	1 1/2" X 1 1/4" Reducing bushing
2	1/2" Pipe Unions - brass to iron seat
1	3/4" X 1/2" Bushing
9	1/2" Ells
1	1/2" Pet cock
3	1/2" Street Ell
1	1/2" Close Nipple
1	Air strainer
2	3/4" Street Ells
1	1/2" X 6" Nipple
1	1/2" X 8" Nipple
1	3/4" X 6" Nipple

Items furnished by R.R. (A5 Movt.)	
1	7"X9"X11'-0" Tie. Fig. 3
3	7"X9"X11'-0" Ties. Fig. 4
1	C.P. Valve foundation. E-517-A
1	1/2"X2"X6'-0" Tie strap
4	3/4"X6" Lag screws
4	1/2"X10" Anchor bolts, nuts & wash.
1	1 1/4" X 3'-2" Flex Conduit
2	1 1/4" Squeeze connectors
1	Raco Riser No 464-2
2	Insulating Fibers, Fig. 1
1	Signal padlock
1	Pipe guard - Fig. 2
2	Morden Gauge Plates with drive lag screws for ___# Rail
2	Morden Slide Plates with drive lag screws for ___# Rail
6	Morden Adjustable Rail Braces for ___# Rail.
–	Necessary X-heavy 1/2" pipe for location


Tie No 3
Tie No 2
Tie No 1
Tie No 0
Fiber, Fig. 1, 5/8" or thicker to suit turnout. When fiber thickness greater than 3/4" is required bushings must be lengthened accordingly by amount required, length somewhat from bushing Fig. 5.
Operating Rod.
Lock Rod.
Point Det. Rod - (A-5 Movt. only)
A1 Movt. Only.
7/8" X 8" Drive log screws
3/4" X 6" Lag screws
3'-6"


To suit local conditions
Centers of street ells to be on level with centers of outlets in cylinder.
Pipe Guard - Fig. 2
For foundation details see E-517-A.
130 Ohm "C.P." Switch Valve.
Height of top of Foundation above ground to suit local conditions.
Raco Riser Box No 464-2
1 1/4" Flex. Conduit. 3'-2" long
1 1/2" X 1 1/4" Reducing bushing

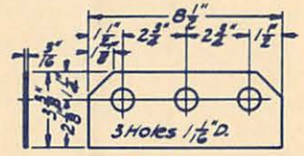


Fig. 1
Gauge Plate Insulating Fiber.

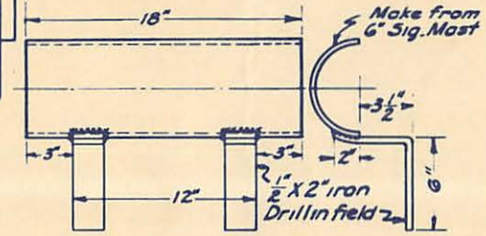


Fig. 2
Pipe Guard
Furnish comp. with 2-1/2"X2" bolts, nuts and lock washers.

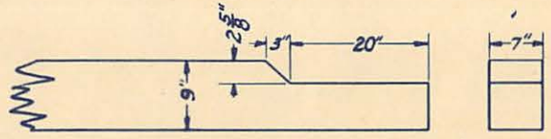


Fig. 3
Framing of Tie No 1

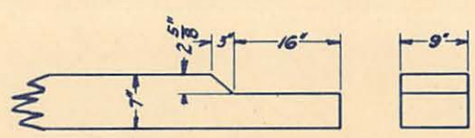


Fig. 4
Framing of Ties No 0, 2, 3.

Note –
Framing of ties identical for A1 and A5 Movts. Tie No 0 to be 7"X9"X13'-0" for A1 Movt. All other ties 7"X9"X11'-0".

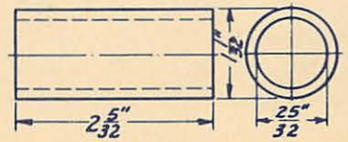


Fig. 5
Fiber Bushing.

REVISIONS
REV. & RED'N. 2-20-46
REV. 4-15-46. M.D.G.
REV. 9-27-47. M.D.G.
REV. 10-6-47. M.D.G.
REV. 3-11-48. M.D.G.
REV. 7-15-48. M.D.G.
REV. 6-24-49. M.D.G.

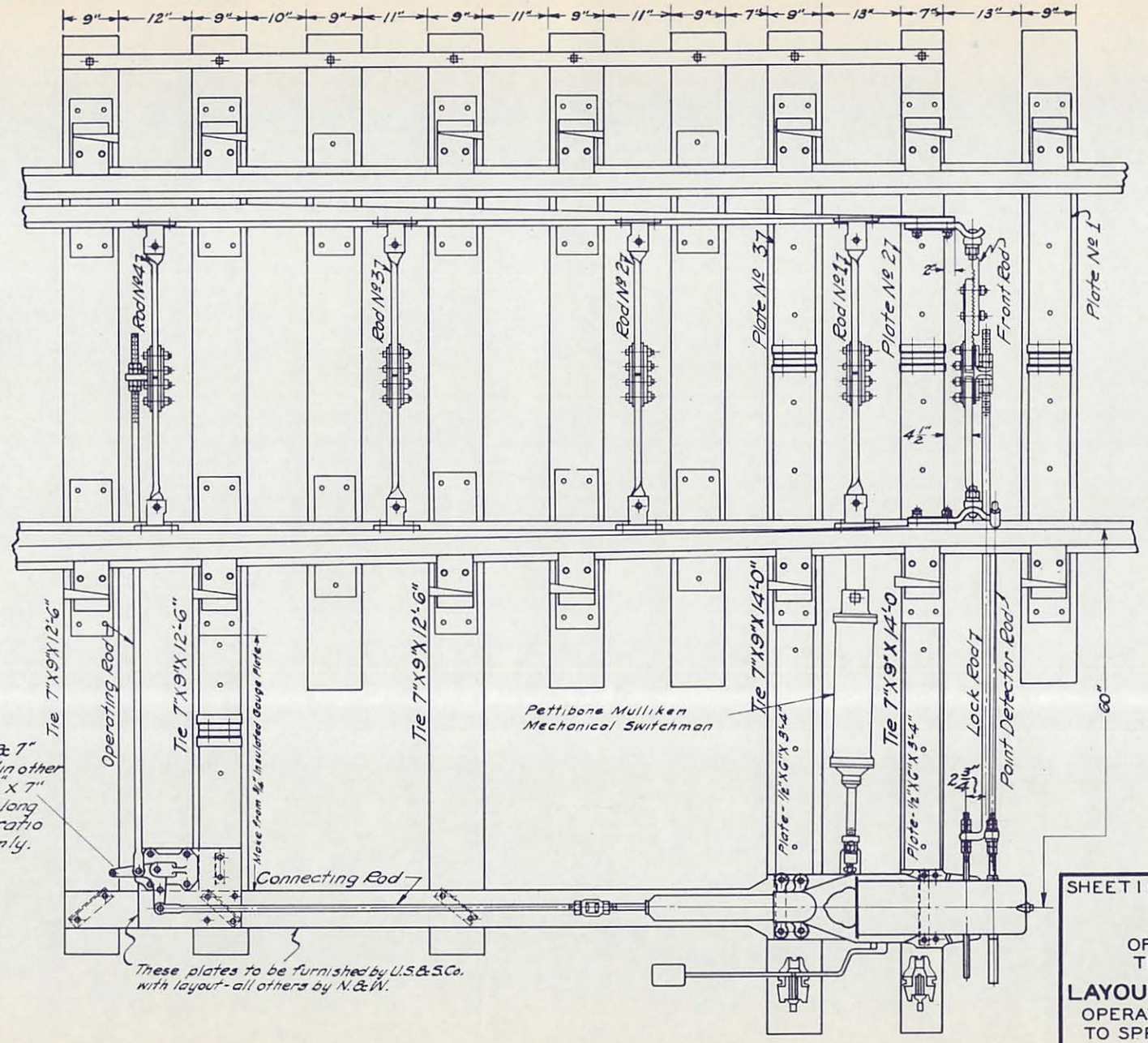
ONE SHEET E-649-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT. STYLE A1 & A5 E.P. SWITCH MOVEMENTS

ROANOKE, VA. FEB. 8, 1940


9" 12" 9" 10" 9" 11" 9" 11" 9" 11" 9" 7½" 9" 13" 7½" 13" 9"
Rod No 47
Rod No 37
Rod No 27
Plate No 37
Rod No 17
Plate No 27
Front Rod
Plate No 1
4½"
Tie 7"X9"X12'-6"
Operating Rod
Tie 7"X9"X12'-6"
Move from ½" Insulated Gauge Plate
Tie 7"X9"X12'-6"
Pettibone Mulliken Mechanical Switchman
Tie 7"X9"X14'-0"
Plate - ½"X6"X 3'-4"
Tie 7"X9"X14'-0"
Plate - ½"X6"X 3'-4"
Lock Rod
Point Detector Rod
60"
Connecting Rod
These plates to be furnished by U.S.&S.Co. with layout - all others by N.&W.
Crank has holes at 4½" & 7" in one arm and 3½" & 7" in other arm. Assemble for 4½" X 7" ratio of switches 22ft. long or longer. Use 3½" X 7 ratio at shorter switches only.

REVISIONS
REV. & REDN. 6-30-52

SHEET 1 OF 1 E-650-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT, STYLE S-20 & S-21 MECH.

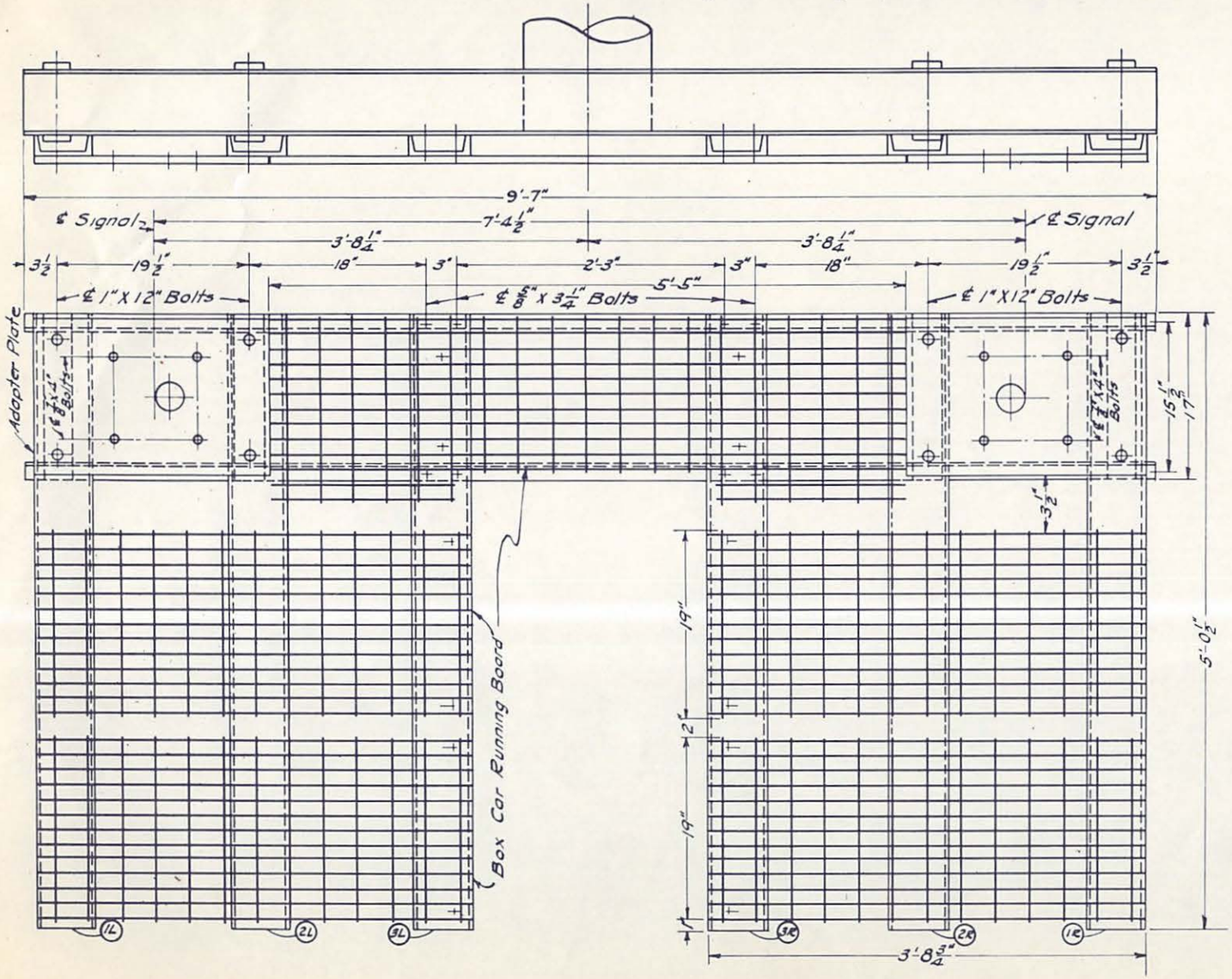
OPERATING FACING POINT LOCK APPLIED TO SPRING SWITCHES.

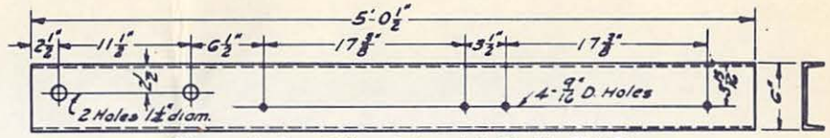
ROANOKE, VA. FEB. 13, 1952

RECEIVED
NOV 2 1953
ORD. INTER SCI.

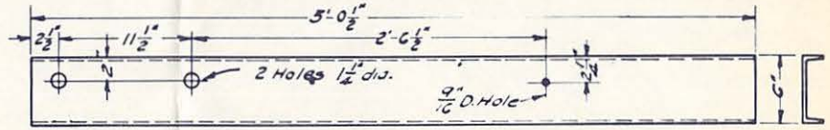
Bolts, Nuts & Washers Required.

8 Bolts 7/8" diam. X 12" long Comp with Nuts & Washers
8 Bolts 7/8" diam. X 4" long " " " " "
8 Bolts 7/8" diam. X 3 1/4" long " " " " "
20 Bolts 1/2 diam X 1" long - Special button-head with lock nuts.

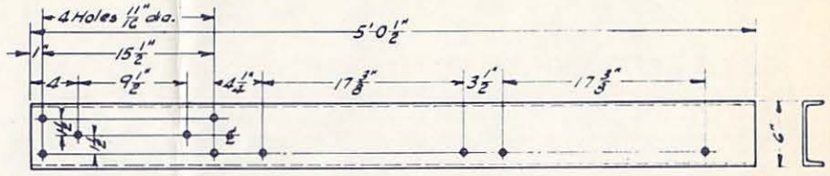




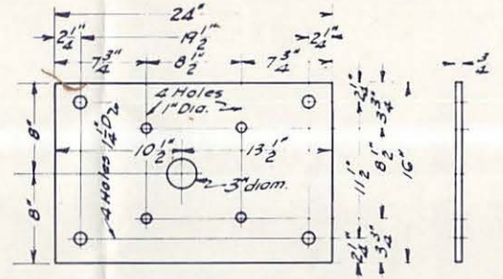
1R 1L Channel - One R.H. and One L.H. Req'd. R.H. Shown
6"-10.5 lbs.



2R 2L Channel - One R.H. and One L.H. Req'd. R.H. Shown.
6"-10.5 lbs.



3R 3L Channel - One R.H. and One L.H. Req'd. R.H. Shown. Holes 7/8" d. unless otherwise shown. 6"-10.5 lbs.



Adapter Plate - Steel - 2 Req'd.

REVISIONS
REDRAWN 7-10-55

ONE SHEET E-667-A

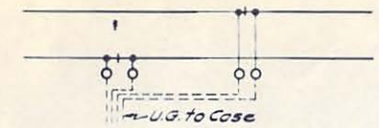
N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

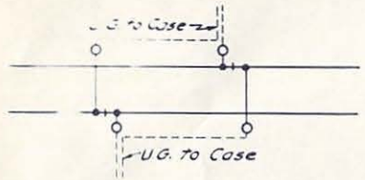
PLATFORM - P.L. BRACKET SIGNAL

ROANOKE, VA. JULY 22, 1943

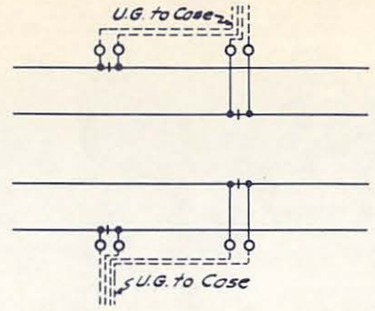
E-667-A



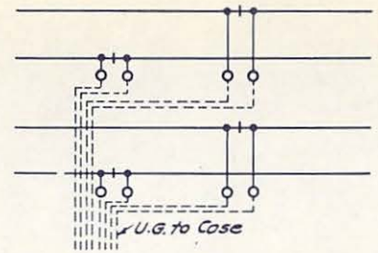
S.A[illegible] LOCATION - SINGLE TRACK



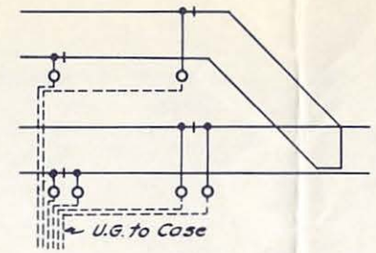
DOUBLE LOCATION - SINGLE TRACK



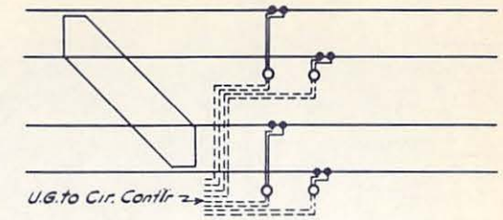
DOUBLE LOCATION - DOUBLE TRACK



DOUBLE LOCATION - DOUBLE TRACK
DOUBLE RUNNING

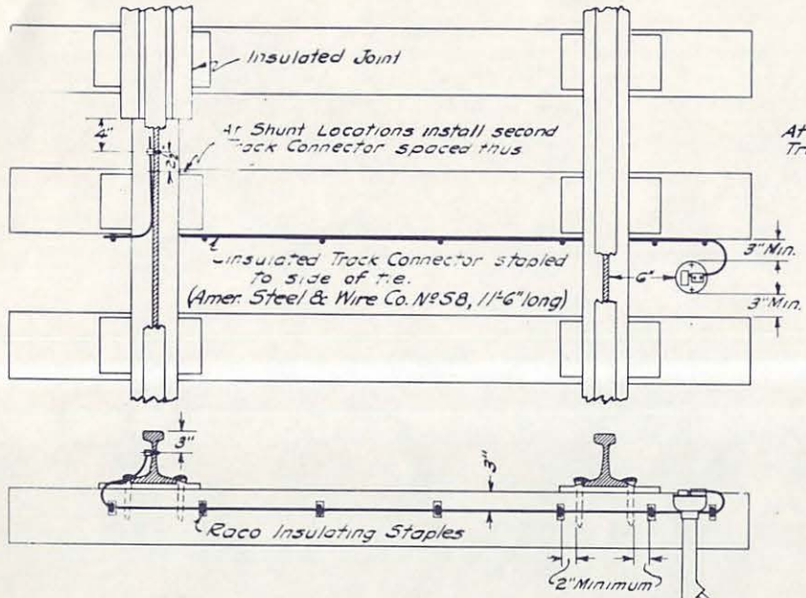


END OF PASSING SIDING

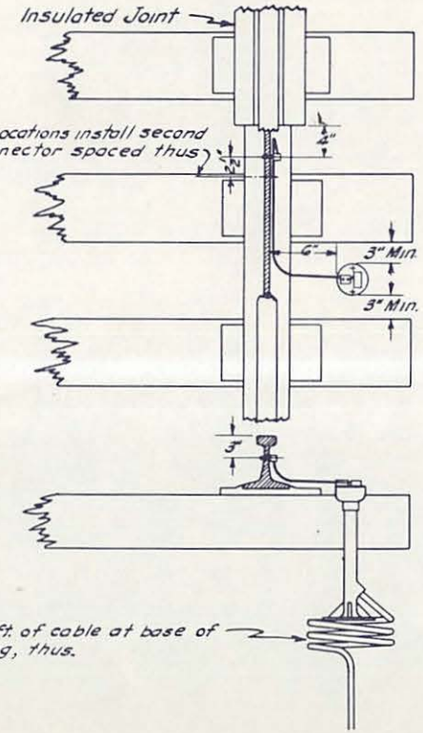


DOUBLE SHUNT AT CROSSOVER

TYPICAL UNDERGROUND CABLE RUNS TO BOOTLEGS

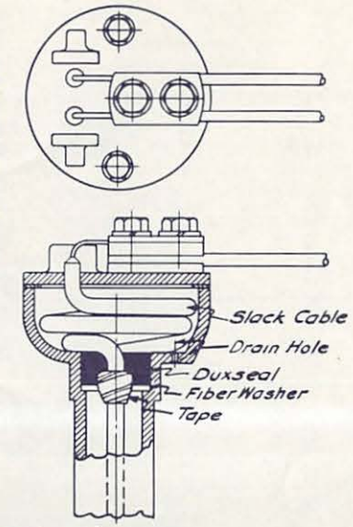


METHOD OF APPLYING RAIL CONNECTOR TO FAR RAIL.



METHOD OF APPLYING RAIL CONNECTOR TO NEAR RAIL

Note- When using old style bootlegs modify as shown here by cutting off solder cup and drilling for one or two track wires as required.



BOOTLEG DETAIL
Roco No. 445-27

REVISIONS
8-23-55. M.D.G.

SHEET 1 OF 1 E-701-A

N. & W. RY.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

RAIL CONNECTORS

ROANOKE, VA. JUNE 6, 1955

REC'D C C ENG
NOV 14 1955

RECEIVED
OCT 10 1955
CUSTOMER SERVICES DEPT.
ORD. SECT.

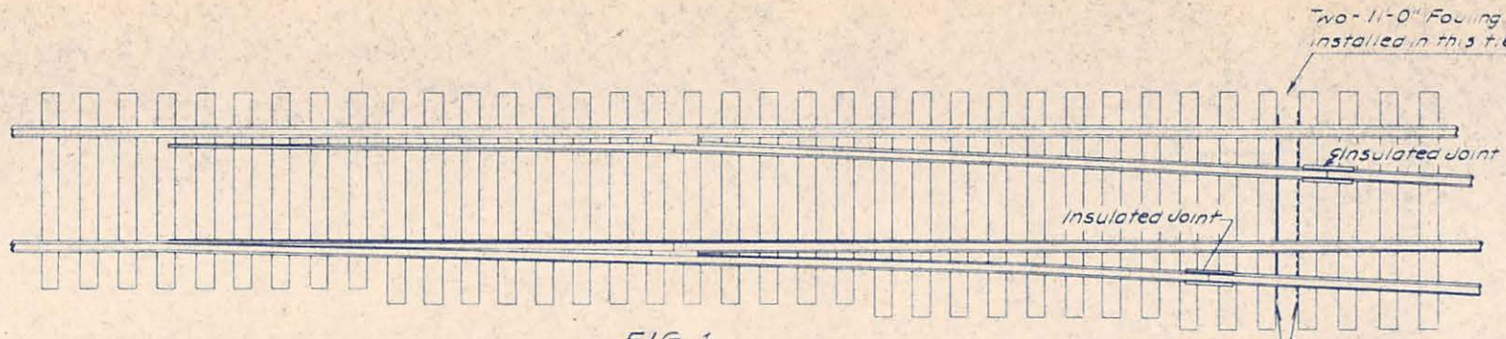

Two - 11-0" Fouling Bonds to be installed in this tie space.
Insulated Joint
Insulated Joint
Install bond on east side of tie on east bound tracks and on west side of tie on west bound tracks.

FIG. 1

Bond Ordering Reference-
Hammer Head Switch Bond, similar to Catalogue No 18600 except to be 11-0" long. Ohio Brass Co.

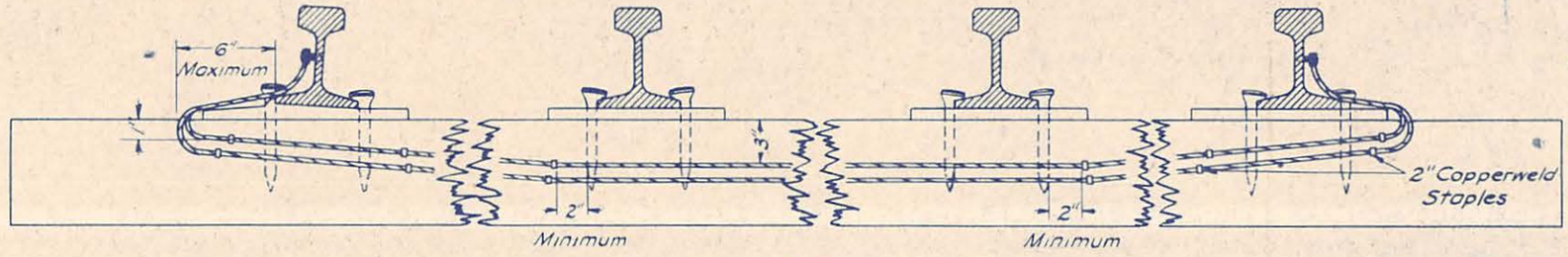


FIG. 2

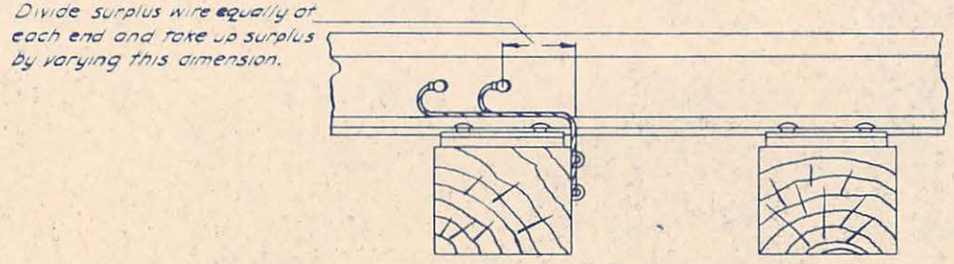


FIG. 3

REVISIONS
REDRAWN 3-5-46.

SHEET 1 OF 1 E-670-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

FOULING BOND. LOCATION AND CLEARANCES

ROANOKE. VA. MAR. 3. 1944

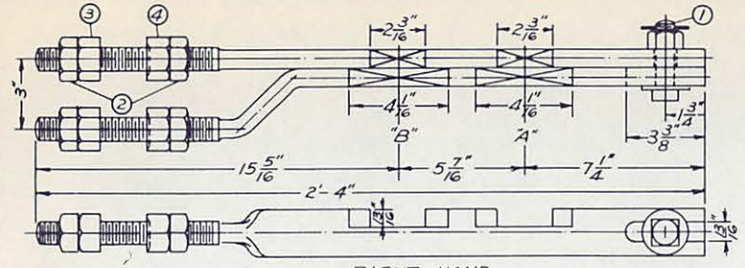


FIG. 1. For "S-2" Facing Point Lock.
NOTCHES AT "B" FOR MOVT LOCATED ON NORMALLY CLOSED POINT SIDE OF SWITCH. SPECIFY NOTCH AT "A" IF FARTHER POINT IS NORMALLY CLOSED. USE BLANKS Nº 2 & 4, FIG. 8.

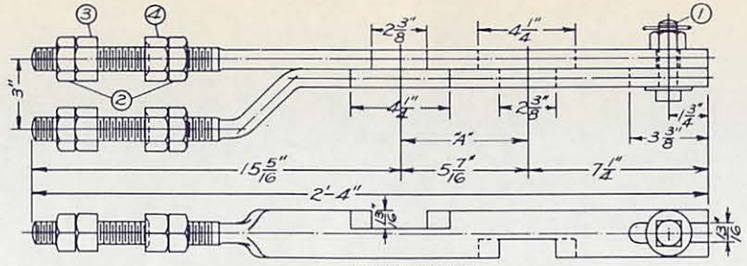


FIG. 2. For "A-1", "A-5" & "B-3" Movts.
USE BLANKS Nº 2 & 4 FIG. 8.

Note - For A-5 Movt. applied to Movable Point Frog at Randolph St., Roanoke, Make Dim. "A" above 4 3/4".

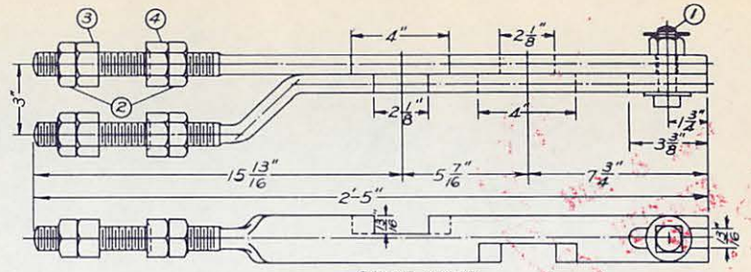


FIG. 3. For Style "B" S. & L. Movt.
USE BLANKS Nº 1 & 3 FIG. 8.

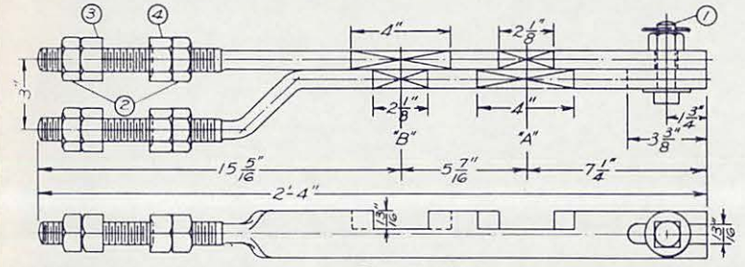


FIG. 4. For Rectangular Plunger Lock
NOTCHES AT "A" & "B" FOR SWITCH LOCKED BOTH NORMAL & REVERSE. OMIT ONE SET OF NOTCHES ("A" OR "B") IF SWITCH IS LOCKED IN NORMAL POSITION ONLY. SPECIFY NOTCHES AT "B" IF POINT NEARER PLUNGER LOCK IS NORMALLY CLOSED AND NOTCHES AT "A" IF FARTHER POINT IS NORMALLY CLOSED. USE BLANKS Nº 2 & 4 FIG. 8.

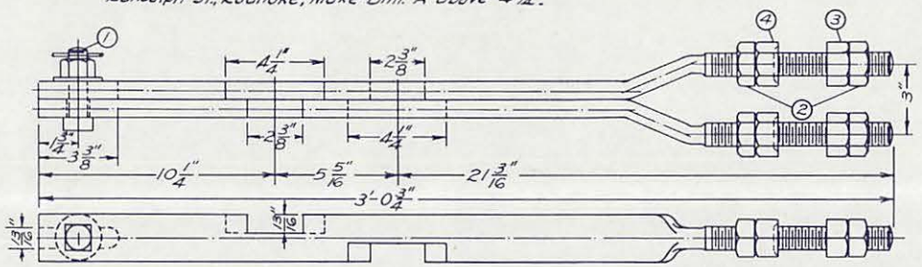


FIG. 5. For Style "M", "M-2" & "M-22" Movts.
USE BLANKS Nº 5 FIG. 8.

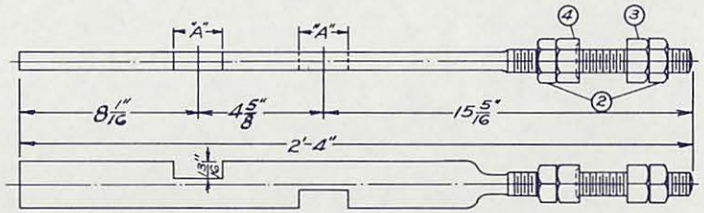
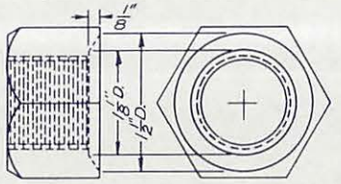


Fig. 6. For "T-21" & "S-20" Switch Movts.
USE BLANKS Nº 2. FIG. 8.
DIMENSION "A" = 2 5/8" FOR "T-21" MOVT.
DIMENSION "A" = 2 3/16" FOR "S-20 MOVT.

See also Fig. 9, Sh. 2.

① 3/4" X 3" N.C. SQ. HD. BOLT, COMP. WITH HEX. NUT, 3/4" S. PLATE WASHER & 3/16" X 1 1/8" COTTER.
② 1"-8TH. HEX. NUT 3/4" THICK.
③ 1"-8TH. HEX. NUT 1" THICK
④ 1"-8TH HEX NUT 1" THICK, COUNTER BORE AS SHOWN BELOW



REVISIONS
REV. 4-28-45 M.D.G.
REV. 8-30-50 M.D.G.
REV. 10-1-53 M.D.G.

SHEET 1 OF 2 E-674-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LOCK RODS - NEW STYLE.

ROANOKE, VA. M.D.G MAR. 6, 1945.

RECEIVED
NOV 2 1953
ORD. INTER. SECT.

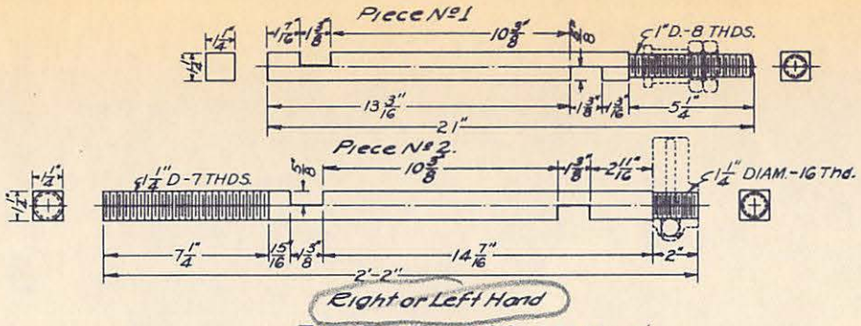
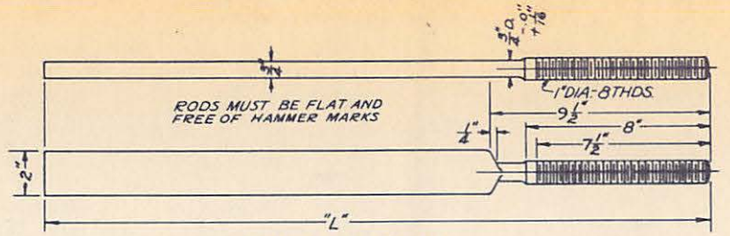
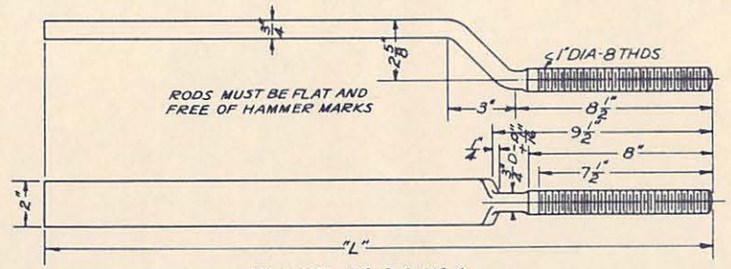


FIG. 7 - For A-20, A21 Movts.

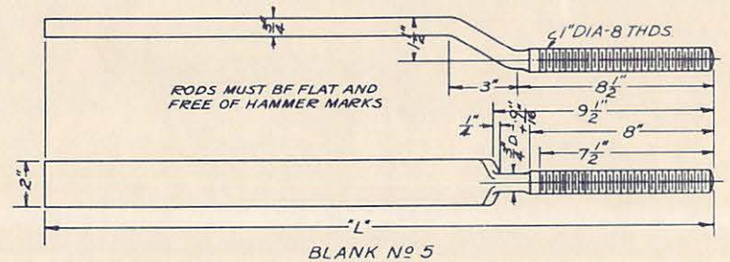


BLANKS No 1 & No 2.



BLANKS No 3 & No 4.

BLANK No	"L" DIMENSION
1	2'-5"
2	2'-4"
3	2'-5"
4	2'-4"
5	3'-0 1/2"



BLANK No 5

Fig. 8. Forged Blanks for Rods on Sheet 1.

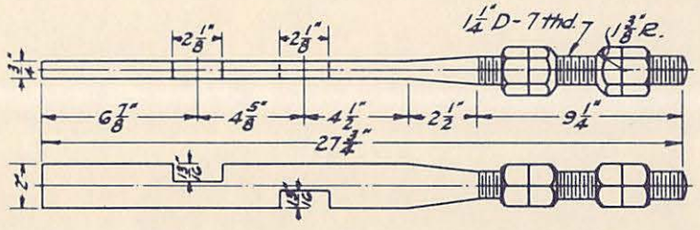


FIG. 9. For T-21 Movt. (See also Fig. 6, Sh 1)
This rod to be used where heavy vibration is encountered.
Lug, U.S.&S. Co. Pt. No. 257403, required for attaching this lock rod to switch front rod.

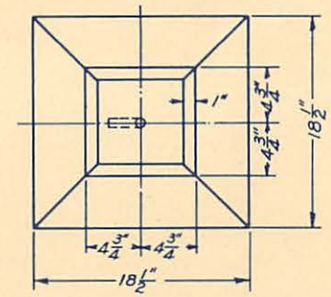
REVISIONS
REV. 4-27-45 M.D.G.
REV. 1-31-46. M.D.G.
REV. 8-30-50 M.D.G.
REV. 4-3-51 M.D.G.

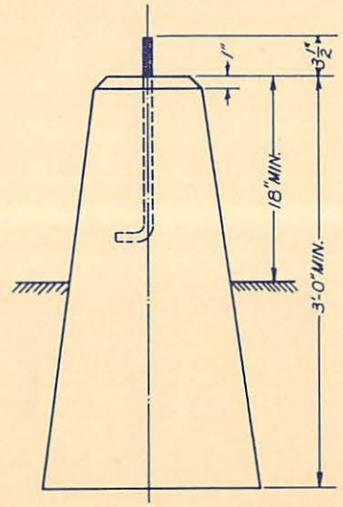
SHEET 2 OF 2 E-674-A

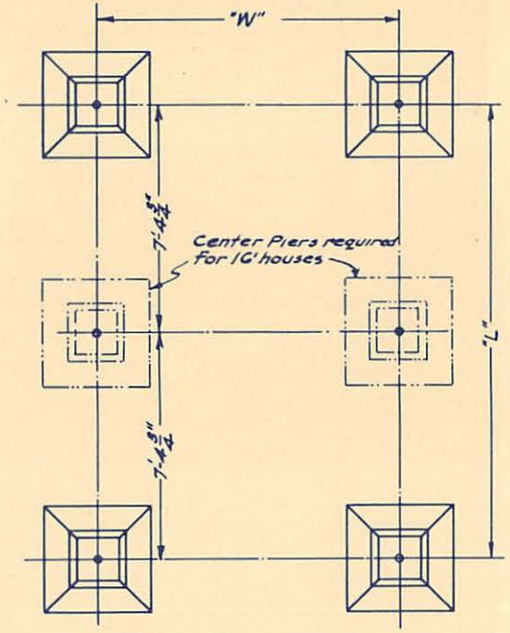
N. & W. Ry.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LOCK RODS - NEW STYLE

ROANOKE, VA. M.D.G. MAR. 6. 1945







LOCATION OF PIERS

TOPS OF ALL PIERS IN SAME PLANE

Dimension "W"	Dimension "L"	House Size
5'-4"	7'-4"	6'X 8'
5'-4"	9'-4"	6'X10'
5'-4"	11'-4"	6'X12'
7'-7 1/2"	14'-9 1/2"	8'-3"X16'-0"

MATERIAL

17.0 CU. FT. STONE
8.5 CU. FT. SAND
4.25 BAGS CEMENT
(CONCRETE MIXTURE 1-2-4)
4 FOUNDATION BOLTS 3/4" X 18" COMP. WITH 3/4" PLATE WASHER AND 3/4" HEX NUT.

NOTE

APPLY TWO COATS DIXON'S R.L. GRAPHITE PRIMER #101 AND TWO COATS DIXON'S GRAPHITE BLACK #108 TO BOTTOM OF HOUSE AND LIBERAL COATING OF N. & W. N°1 CAR CEMENT, ITEM 47-394 SPEC. 119, TO TOP OF EACH PIER BEFORE PLACING HOUSE ON FOUNDATION.

REVISIONS
1-19-50 M.D.G.

SHEET 1 OF 1. E-675-A

N. & W. RY.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

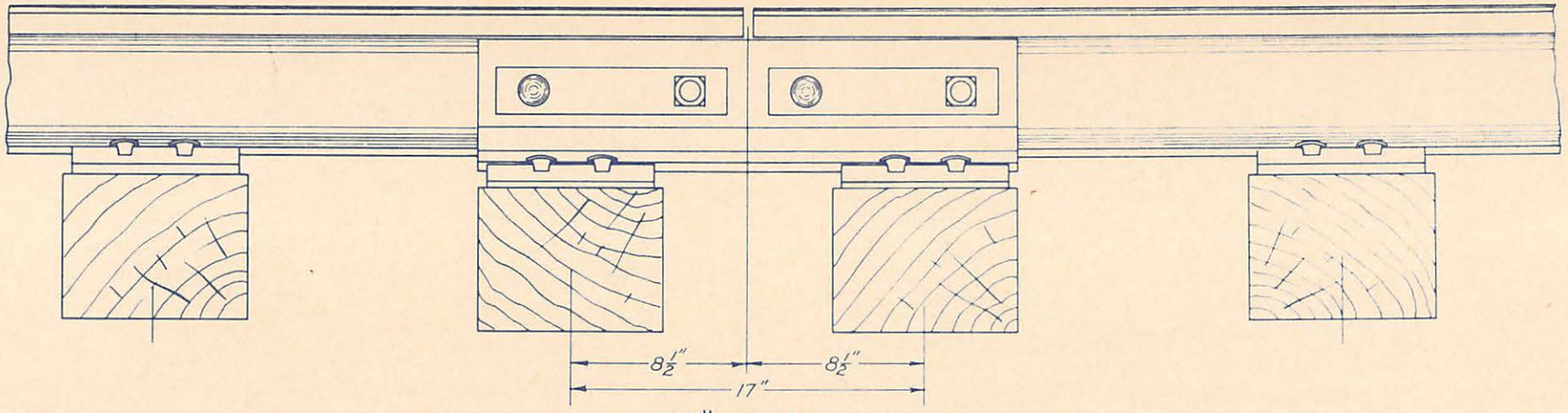
FOUNDATION FOR STEEL INSTRUMENT HOUSE.

ROANOKE, VA. M.D.G. MAR. 14, 1945

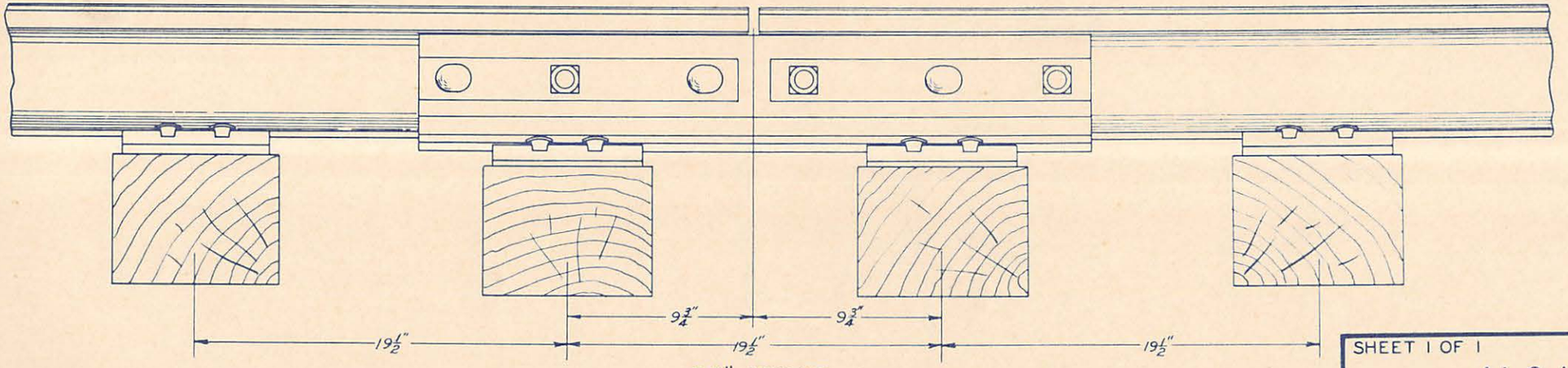
P-FILE NO. 1695

E-675-A

RECEIVED
JAN 31 1950
SPECIFICATION DEPT.



26" JOINT



36" JOINT

REVISIONS
JUNE 25, 1945 MDG

SHEET 1 OF 1 E-676-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

TIE SPACING AT INSULATED JOINTS

ROANOKE, VA. MAY 21, 1945.

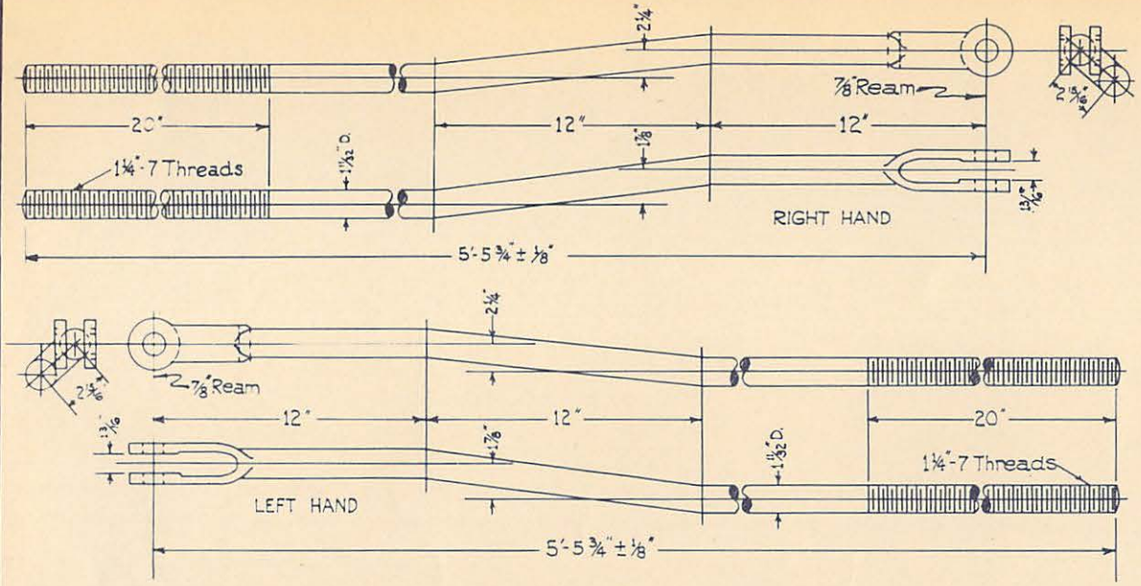


FIG. 1 OPERATING RODS FOR A-1 & A-5 SWITCH & LOCK MOVEMENTS

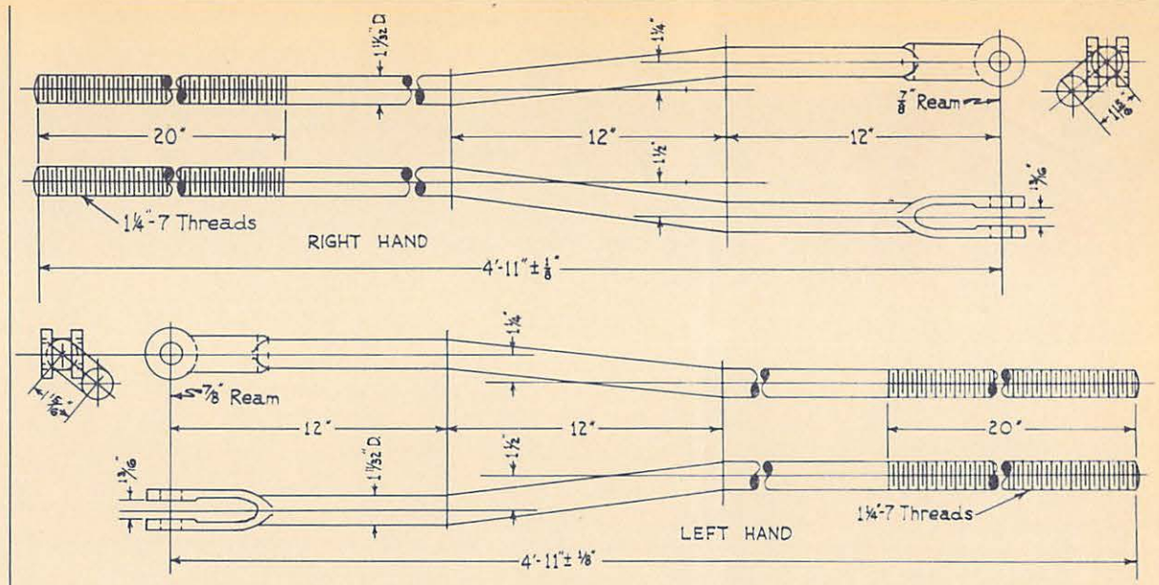


FIG. 2 OPERATING RODS FOR A-20 & A-21 SWITCH & LOCK MOVEMENTS

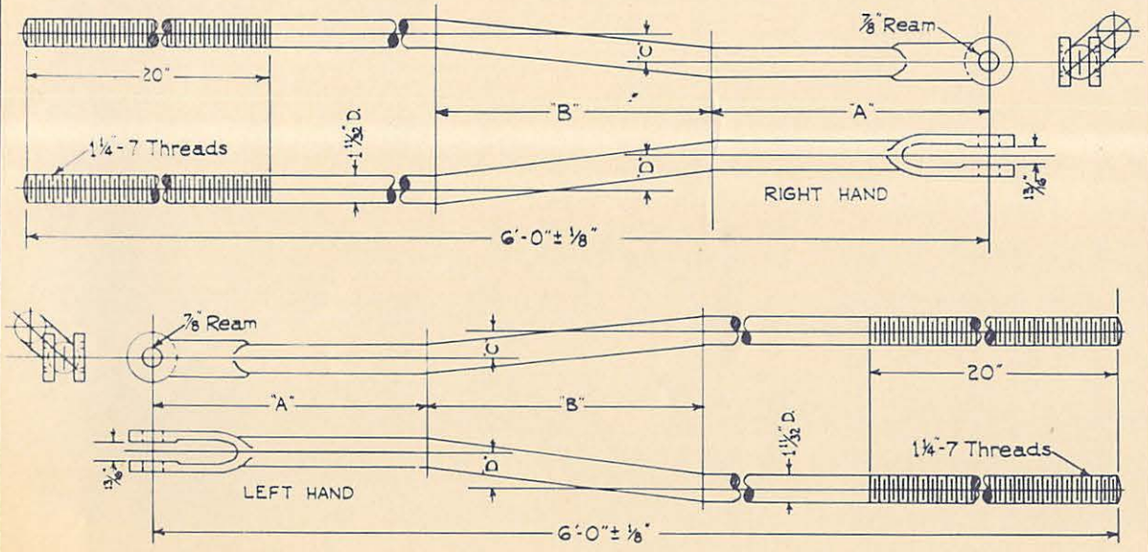


FIG. 3 OPERATING RODS FOR B & B-3 SWITCH & LOCK MOVEMENTS

NOTE: FURNISH DIMENSIONS "A", B, C & D" WHEN ORDERING

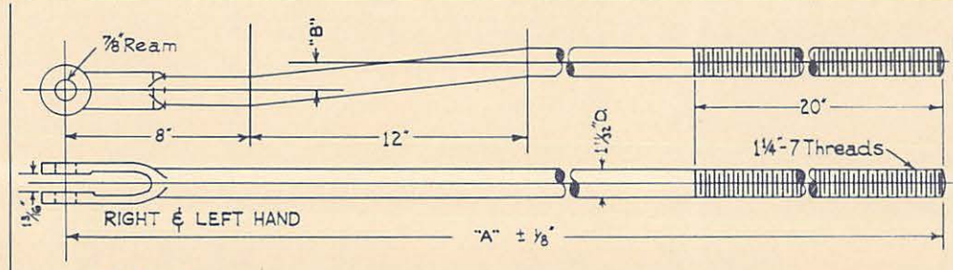


FIG. 4 OPERATING ROD FOR M-2 & M22 SWITCH & LOCK MOVEMENTS

STYLE	DIM. "A"	DIM. "B"
M 2	4'-7"	2 5/8"
M 22	4'-10"	1 3/4"

REVISIONS
Oct, 6, 1947 M.D.G.

SHEET 1 OF 2 E-679-A

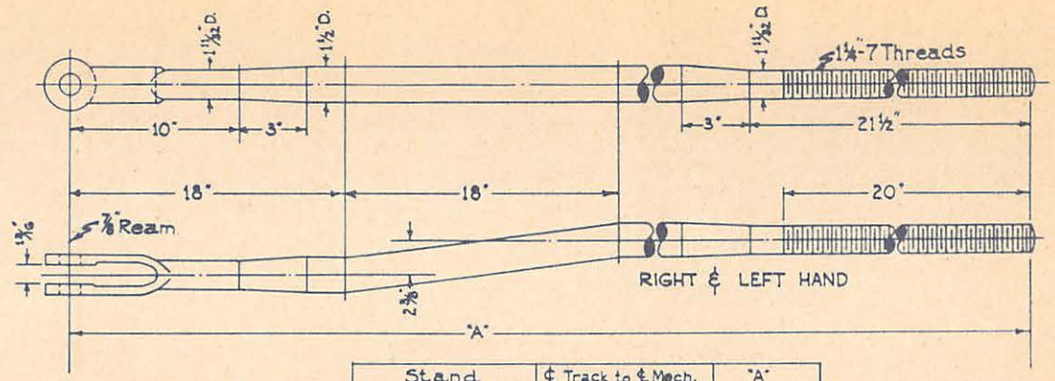
N. & W. RY.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

RODS, SWITCH OPERATING

ROANOKE, VA. MAY 31, 1946

RECEIVED
NOV
19
1947
SPECIFICATION DEPT.



Stand	℄ Track to ℄ Mech.	"A"
Low	6'-6"	6'-5¾"
High	8'-6"	8'-5¾"
High (Ohio)	8'-9"	8'-8¾"

FIG. 5 OPERATING RODS FOR T21 SWITCH LAYOUT

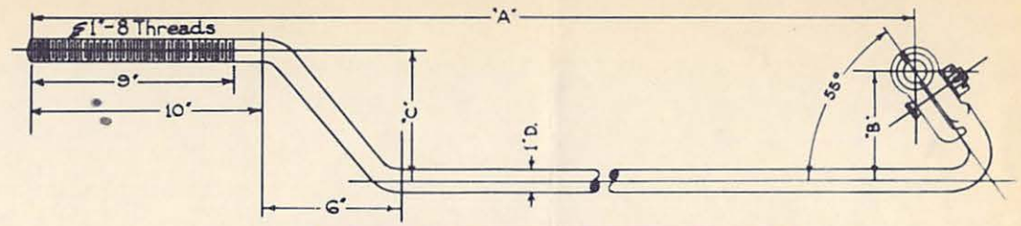
REVISIONS

SHEET 2 OF 2 E-679-A

N. & W. Ry.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

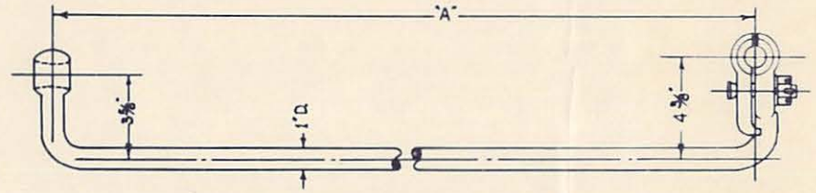
RODS, SWITCH OPERATING

ROANOKE, VA. MAY 31, 1946



Style Movt.	"A"	"B"	"C"
A-5	2'-9⅛"	4¼"	¼"
A-20, A-21	3'-0"	4¼"	—
M-22	3'-1⅛"	4¼"	5½"

FIG. 1 POINT DETECTOR ORERATING RODS FOR A-5, A-20, A-21, M-22 MOVTS.



Target	℄ Track to ℄ Mech.	"A"
T-21 Low	6'-6"	3'-5½"
T-21 High	8'-6"	5'-5½"
T-21 High (Ohio)	8'-9	5'-8½"
S-21	—	4'-4½"

FIG. 2 POINT DETECTOR OPERATING RODS FOR S-21 & T-21 MOVTS.

REVISIONS
REV. 8-30-50 M.D.G.
REV 7-17-51 M.D.G.

ONE SHEET E-680-A

N. & W. Ry.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

RODS, POINT DETECTOR OPERATING

ROANOKE, VA. MAY 31, 1946

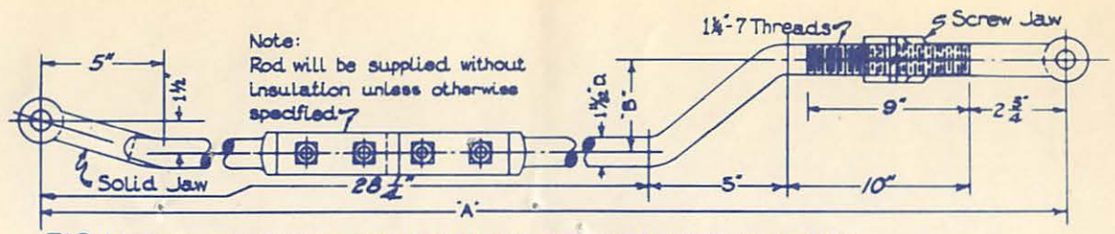


FIG. 1 DERAIL OPERATING ROD AND LOCK ROD OPERATING ROD FOR POWER OPERATED DERAILS. *Dimension "A" = 46", "B" = 3" unless otherwise specified.*

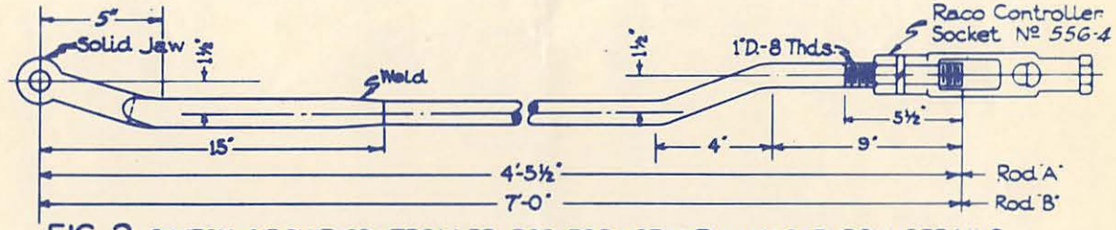
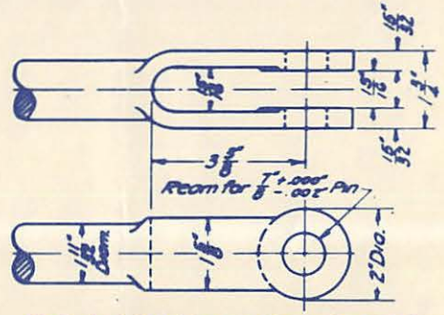


FIG. 2 SWITCH CIRCUIT CONTROLLER ROD FOR USE WITH HAND-THROW DERAILS.
USE ROD "A" WHEN DERAIL IS ON NEAR RAIL AND ROD "B" WHEN DERAIL IS ON FAR RAIL



Detail of Solid Jaw on Rods Fig. 1 & 2

REVISIONS
REV. 7-16-48 M.D.G.
REV. 3-22-50. M.D.G.
REV. 7-29-52 M.D.G.

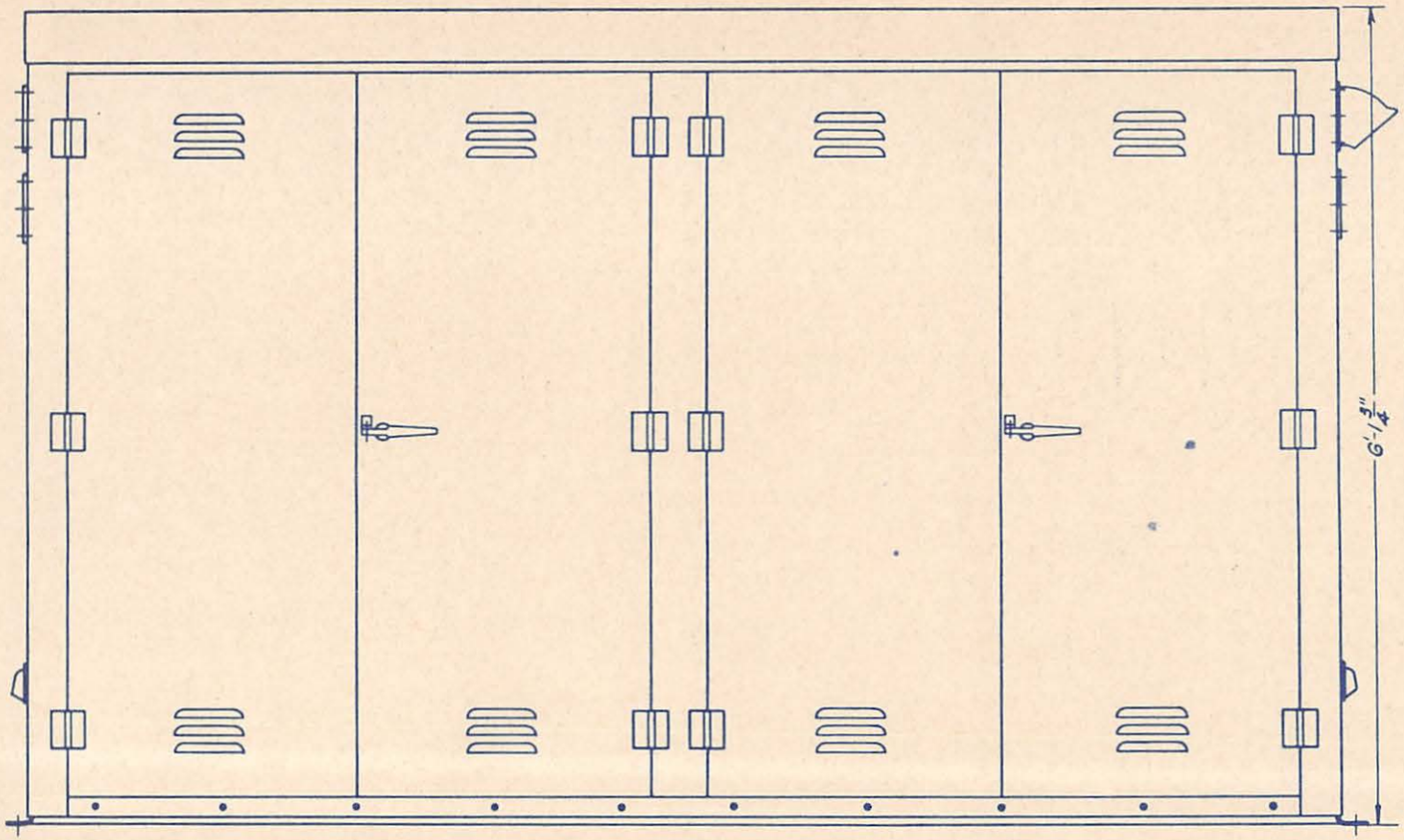
ONE SHEET E-681-A

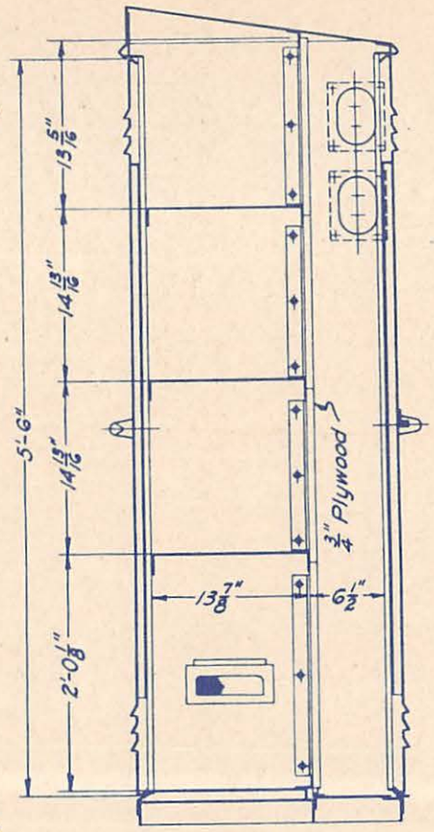
N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

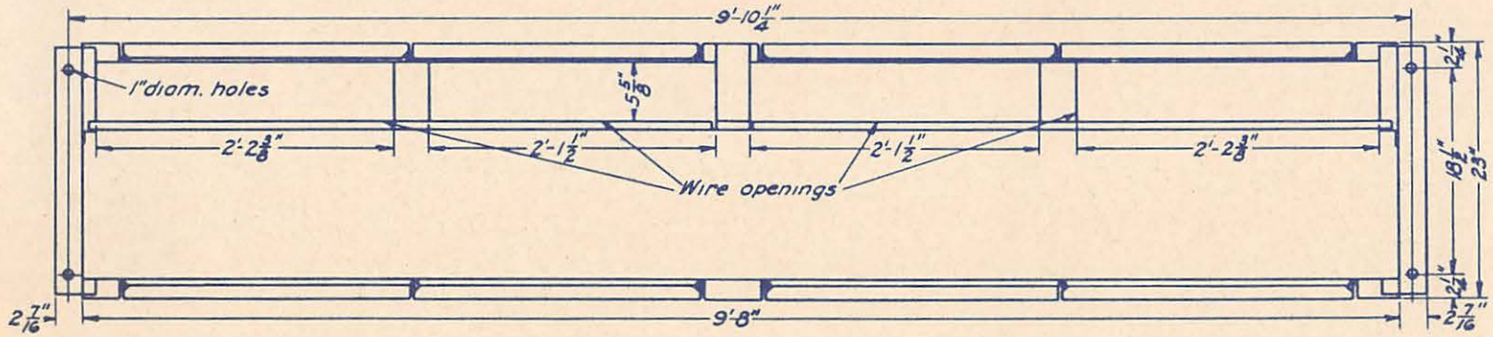
RODS, MISCELLANEOUS

ROANOKE, VA. JUNE 12, 1946





Section.



REVISIONS

SHEET 1 OF 2

E-682-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

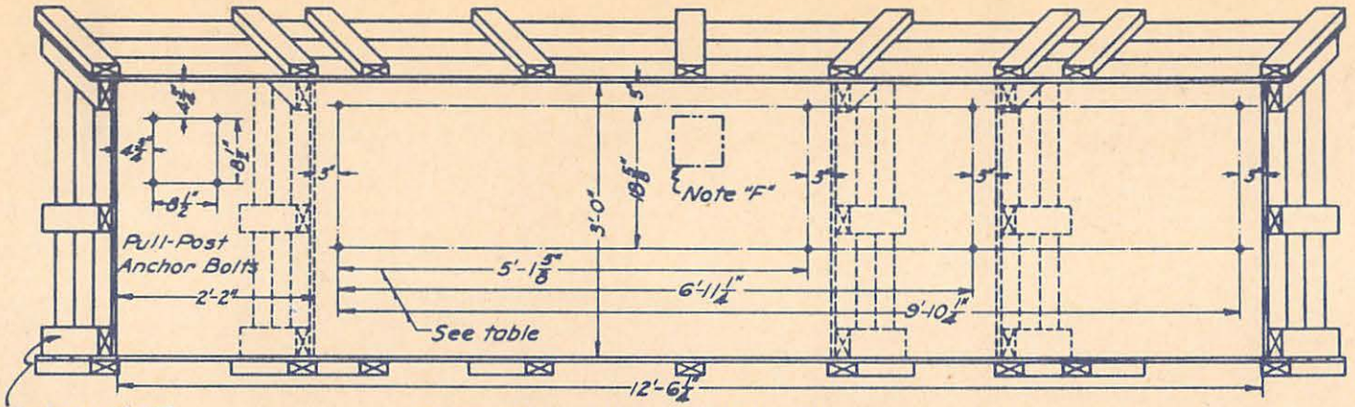
RELAY CASE, SHEET STEEL AND FOUNDATION FORM

ROANOKE, VA.

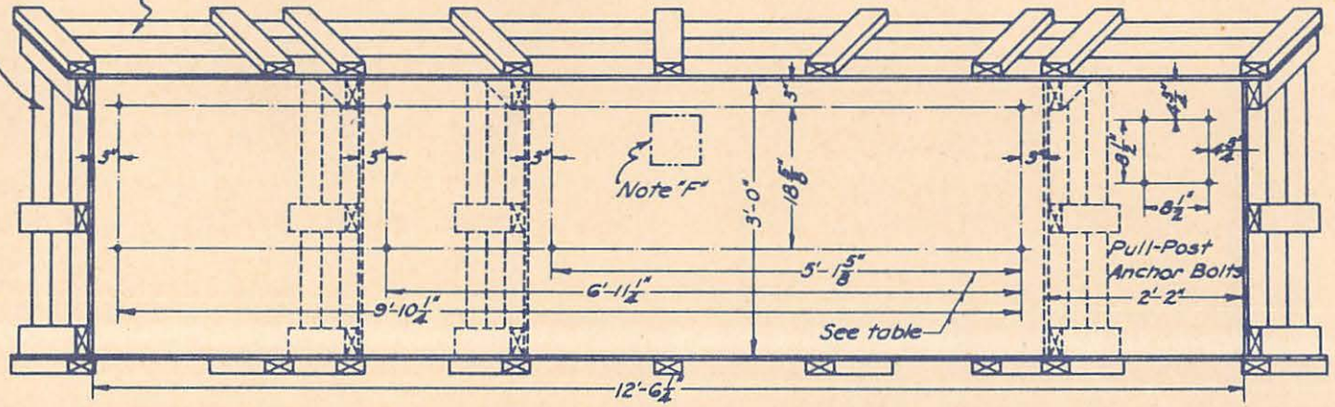
JUNE 19, 1946.

SUPERSEDES E-593

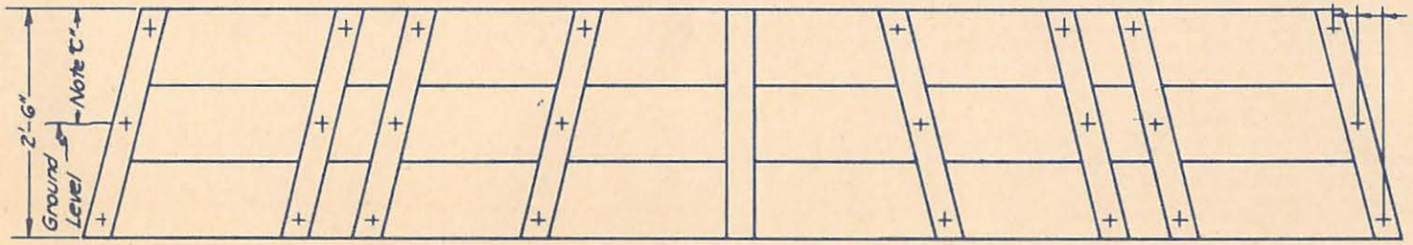
E-682-A



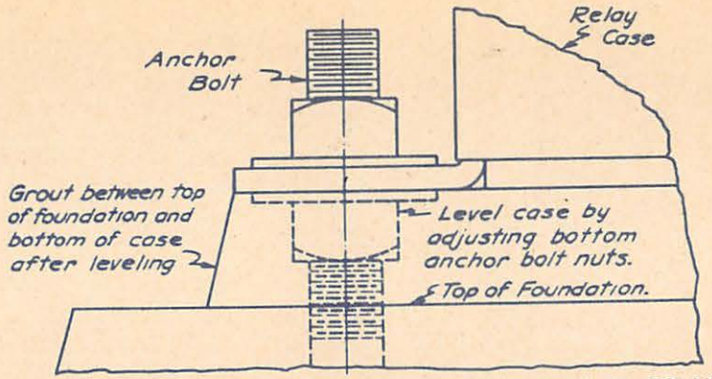
PLAN SHOWING PULL-POST ON LEFT END



PLAN SHOWING PULL-POST ON RIGHT END



ELEVATION


Relay ℄ Case
Anchor Bolt
Grout between top of foundation and bottom of case after leveling
Level case by adjusting bottom anchor bolt nuts.
℄ Top of Foundation.

DETAIL SHOWING METHOD OF LEVELING CASE ON FOUND'N.

Notes-

"A" Form to be lined with Masonite

"B" All anchor bolts ¾"X 14"- to project 3" above foundation.

"C" Top of foundation to be 18" above ground except in extreme cases where local conditions indicate a greater height.

"D" Where two or more cases are placed on continuous foundation locate anchor bolts of adjacent cases on 12" centers except where pull-post is to be located between cases in which instance locate on 24" centers.

"E" For detail of conduit between cases see Sketch 2547.

"F" Lead-in opening. Size, location and direction to suit.

"G" Concrete mix: 1-2½-3½.

Longitudinal anchor bolt spacing	Size of case
5'-1⅝"	4'-11"
6'-11¼"	6'-9"
9'-10¼"	9'-8"

REVISIONS

SHEET 2 OF 2

E-682-A

N. & W. Ry.

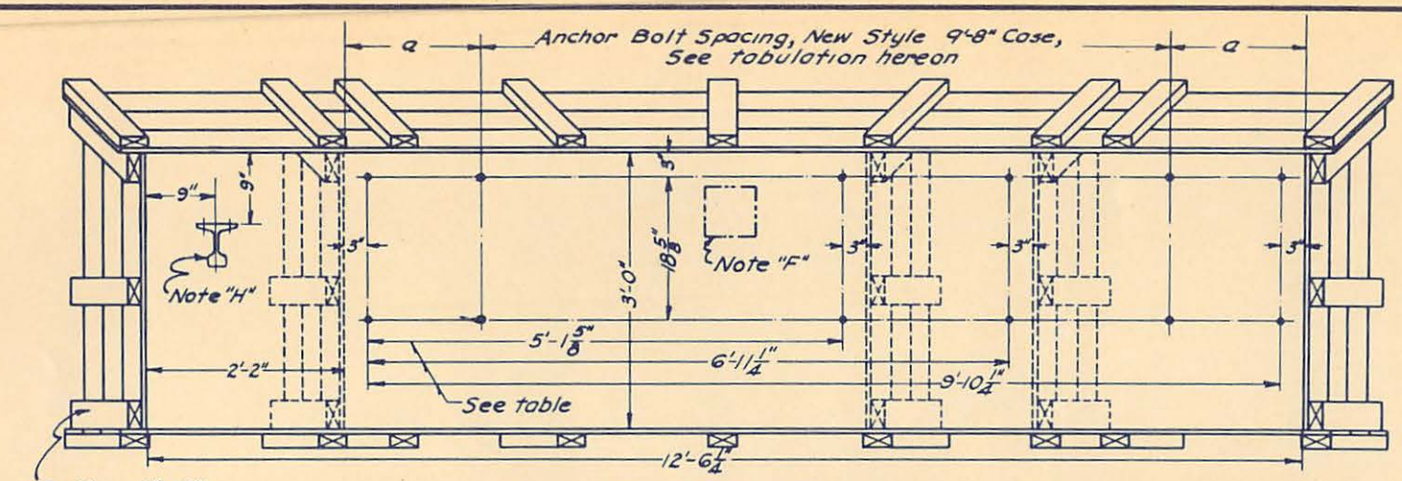
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

RELAY CASE, SHEET STEEL AND FOUNDATION FORM

ROANOKE, VA. JUNE 19. 1946

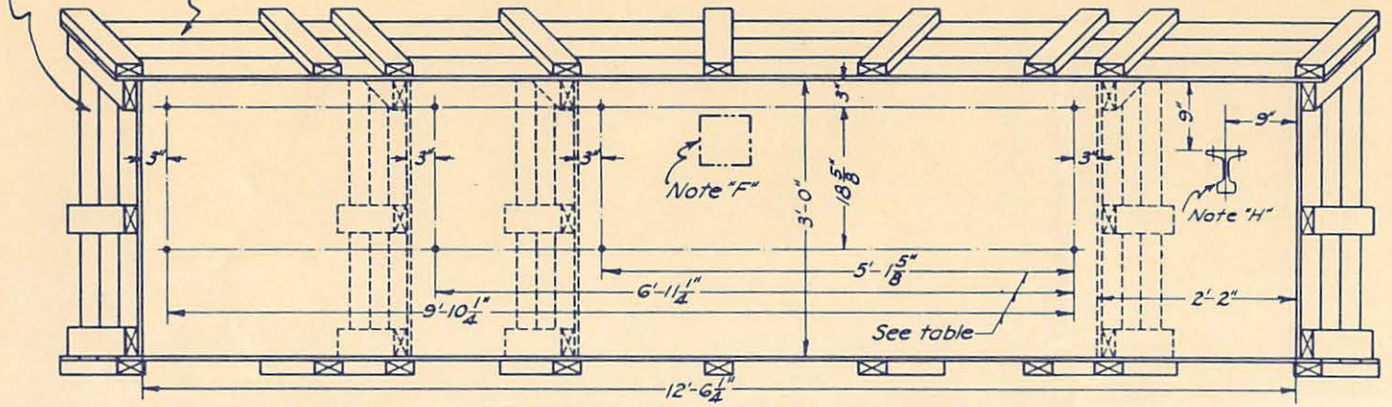
SUPERSEDES E-593

E-682-A

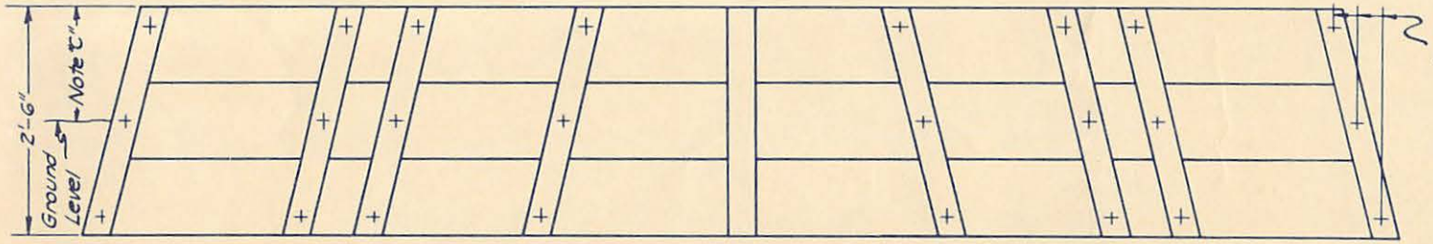


PLAN SHOWING PULL-POST ON LEFT END

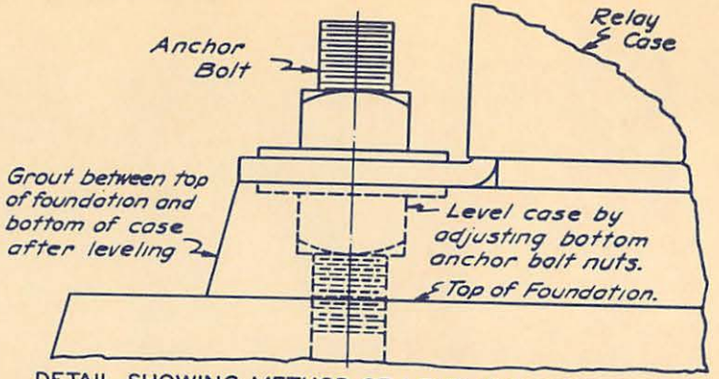
Batter: 3"=12"



PLAN SHOWING PULL-POST ON RIGHT END



ELEVATION


Anchor Bolt
Relay & Case
Grout between top of foundation and bottom of case after leveling
Level case by adjusting bottom anchor bolt nuts.
Top of Foundation.

DETAIL SHOWING METHOD OF LEVELING CASE ON FOUND'N.

Notes-

"A" Form to be lined with Masonite

"B" All anchor bolts ¾"X 14"- to project 3" for Old Style, 5¼" for New Style

"C" Top of foundation to be 18" above ground except in extreme cases where local conditions indicate a greater height.

"D" Where two or more cases are placed on continuous foundation locate anchor bolts of adjacent cases on 12" centers except where pull-post is to be located between cases in which instance locate on 24" centers.

"E" For detail of conduit between cases see Sketch 2547.

"F" Lead-in opening. Size, location and direction to suit.

"G" Concrete mix: 1-2½-3½.

"H" Scrap rail Pull-Post. Imbed in concrete 2'-0" See Sketch 2728.

Long't. Anchor Bolt Spacing		Dim.	Case
Old Style	New Style	"a"	Size
	2'-8"	5½"	3'-3½"
5'-1⅝"	4'-2"	8 9/16"	4'-11"
6'-11¼"	6'-0"	8⅝"	6'-9"
9'-10¼"	7'-6"	1'-5⅛"	9'-8"

REVISIONS
5-7-47 M.D.G.
REV. 7-1-49. M.D.G.

SUPERSEDES E-593

SHEET 2 OF 2

E-682-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

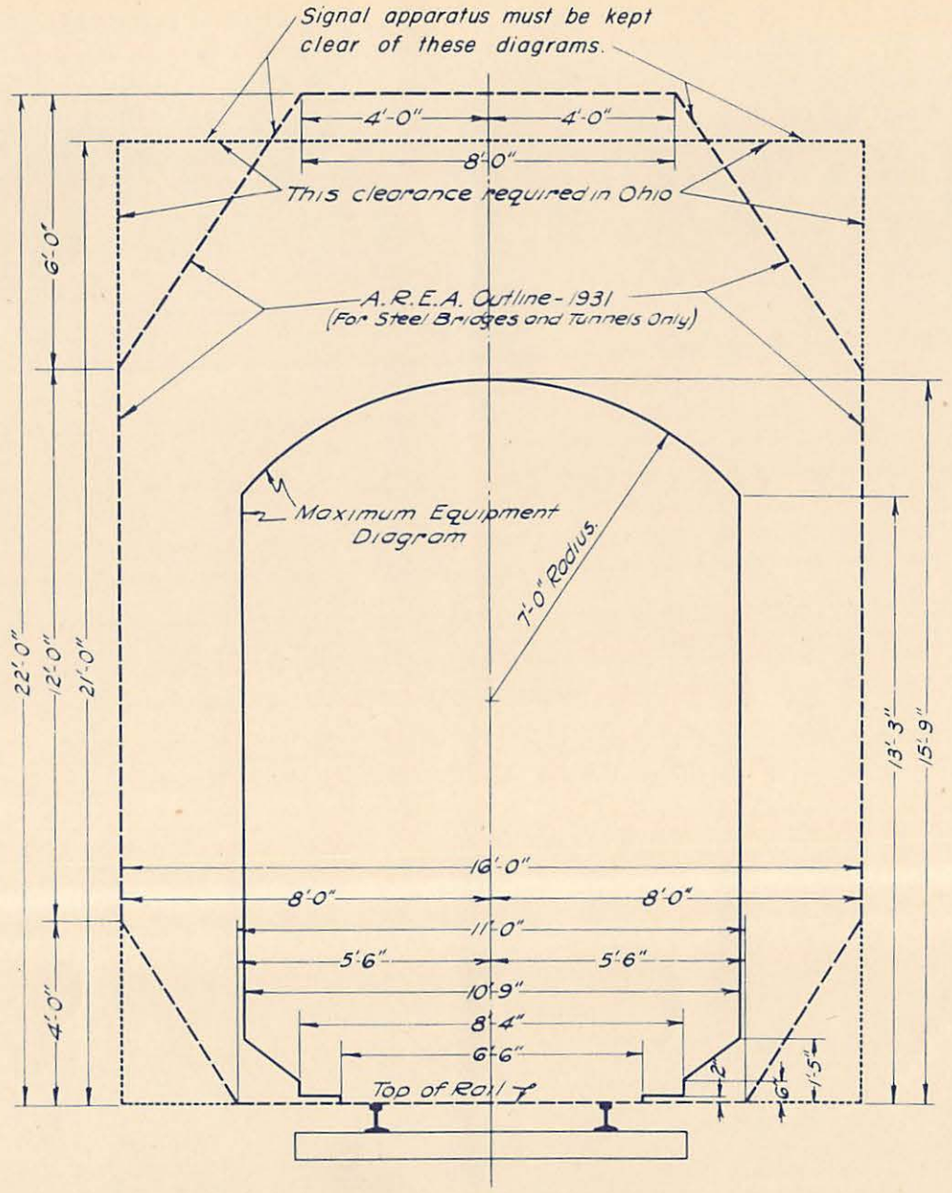
RELAY CASE, SHEET STEEL AND FOUNDATION FORM

ROANOKE, VA.

JUNE 19. 1946

E-682-A

RECEIVED
AUG 23 1949
SPECIFICATION DEPT.



BRIDGE AND EQUIPMENT DIAGRAMS.

The clearances shown are for tracks on tangent. When track is curved the width of diagram shall be increased so as to allow the same minimum clearances on curves by providing clearance for an 84 foot car of the cross-section of the diagram shown, distance center to center of trucks being 60 feet, overhang at each end being 12 feet.

Proper allowance shall be made for super-elevation of outer rail.

For structures crossing overhead, clearance above top of rail should be 25-0" where practicable, and in electrified territory 30-0" above top of rail.

REVISIONS

SHEET 1 OF 1 E-683-A

N. & W. RY.

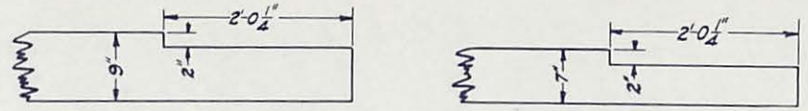
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

CLEARANCE DIAGRAM

ROANOKE, VA. OCT. 14, 1946.

E-683-A

RECEIVED
DEC
26
1946
SPECIFICATION DEPT.



Tie No. 1 - 7"X 9"X 11'-9"

Tie No. 2 - 7"X 9"X 11'-9"

FRAMING OF TIES.

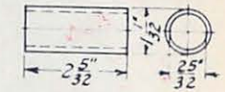


Fig. 2.
Fiber Bushing.

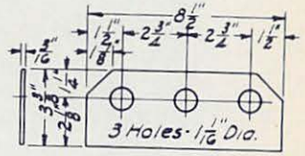
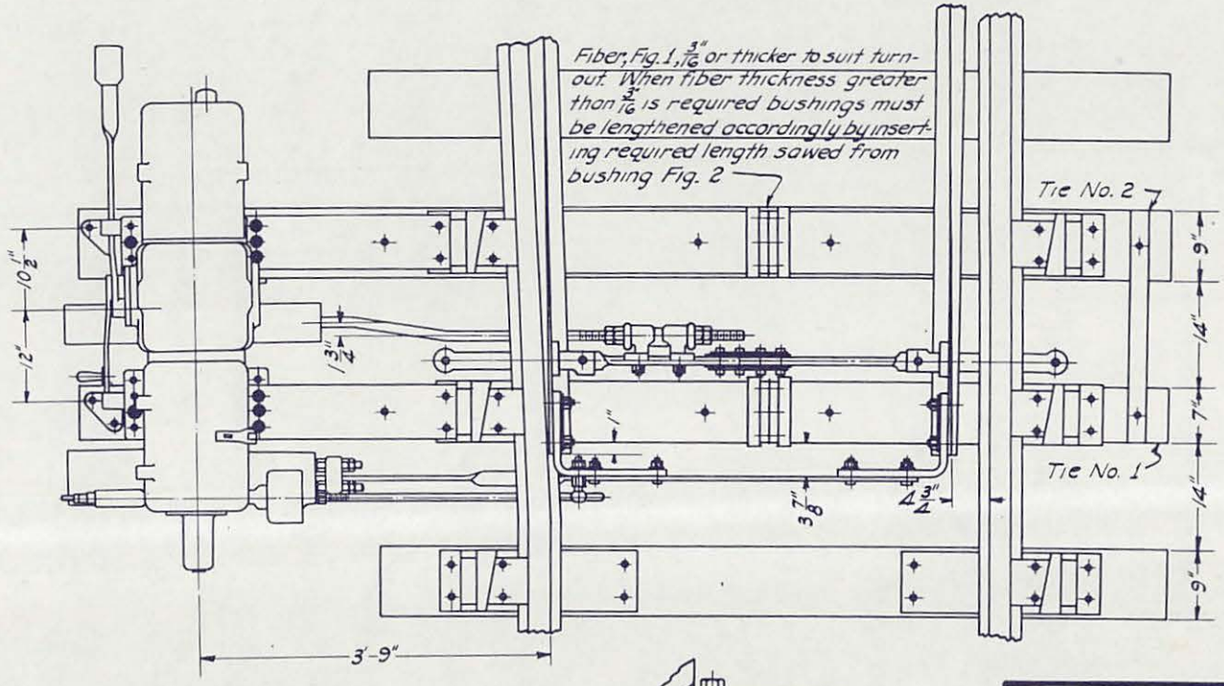
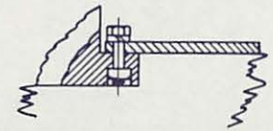


Fig. 1
Gauge Plate Insulating Fiber.



FOR DETAILS OF
OPERATING ROD SEE E-679-A
LOCK RODS SEE E-674-A
POINT DET. ROD SEE E-680-A
FRONT RODS SEE E-659-A
GAUGE PLATES SEE C.E. L382



Method of Attaching Gage Plate to Mort.
2-Dowel Bolts as shown & 1-Bolt thru Tie.

REVISIONS
REV. 7-16-48 M.D.G.
REV. 1-6-53. M.D.G.

ONE SHEET E-684-A

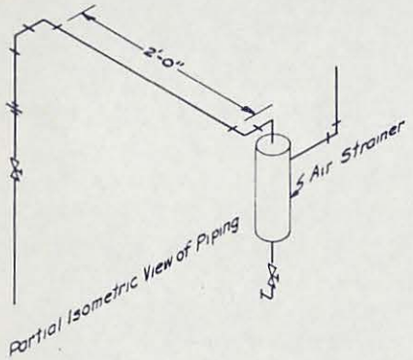
N. & W. Ry.

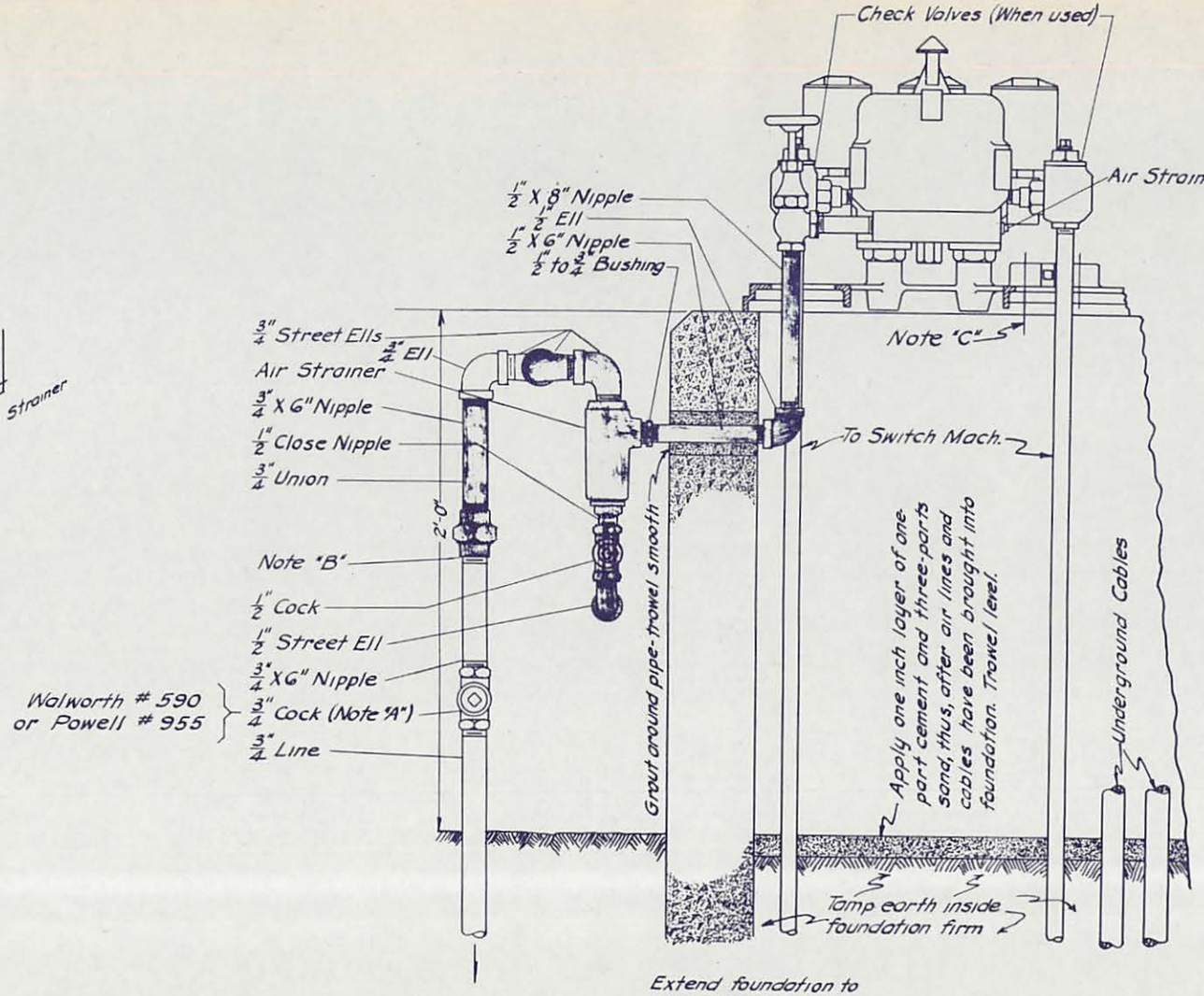
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT, STYLE M22, M23A ELEC. SWITCH MOVEMENT

ROANOKE, VA. OCT. 3, 1947

NOV 2 1953
ORD. INTER. SEQ.





Notes–

"A" This cock not to be used on Single Switch installations nor other installations in which the "C.P" Valve may be isolated by another cock located nearer source.

"B" Air Strainer and fittings shown shaded are furnished with C.P. Valve as ordered from Mfgr. with A5 and A21 Sw. Movts.

"C" Do not use this space for cable entrance so as to provide more clearance for removal of air strainer.

REVISIONS
REV. 10-2-48 M.D.G.
REV. 7-22-53 M.D.G.

ONE SHEET

E-685-A

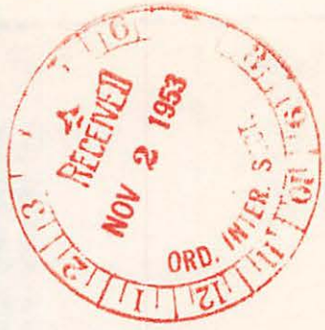
N. & W. Ry.

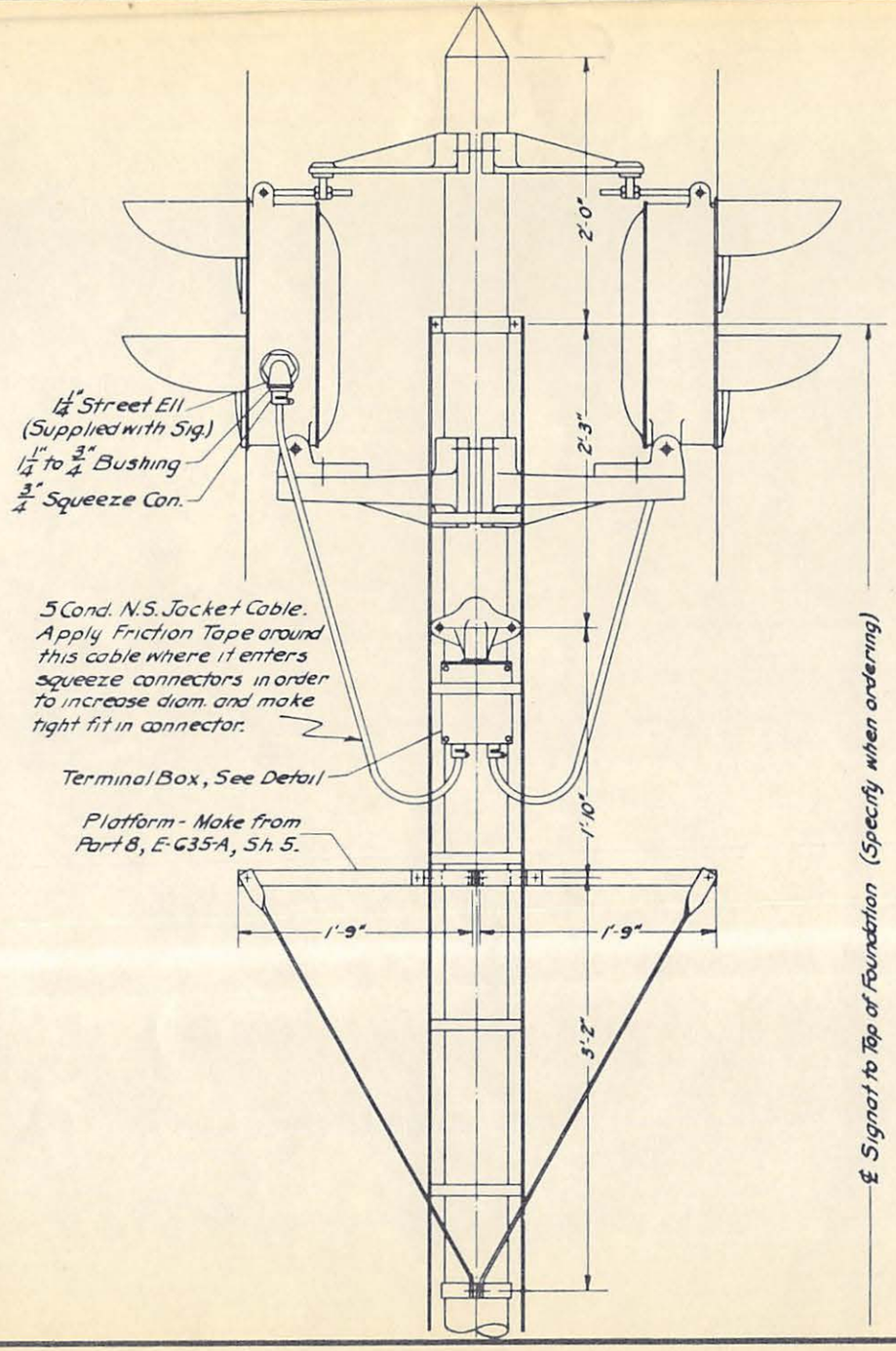
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

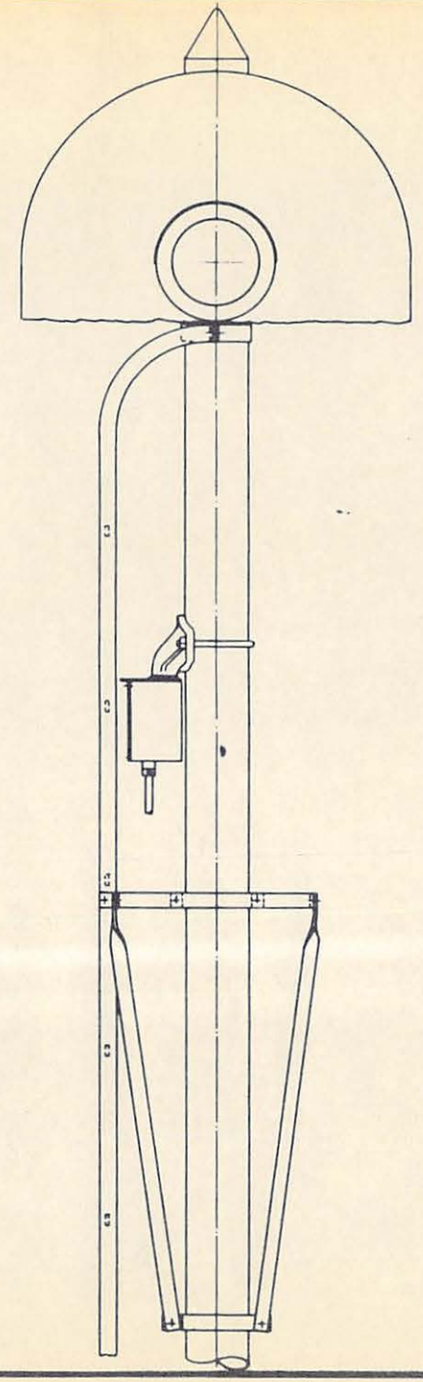
"CP" VALVE PIPING

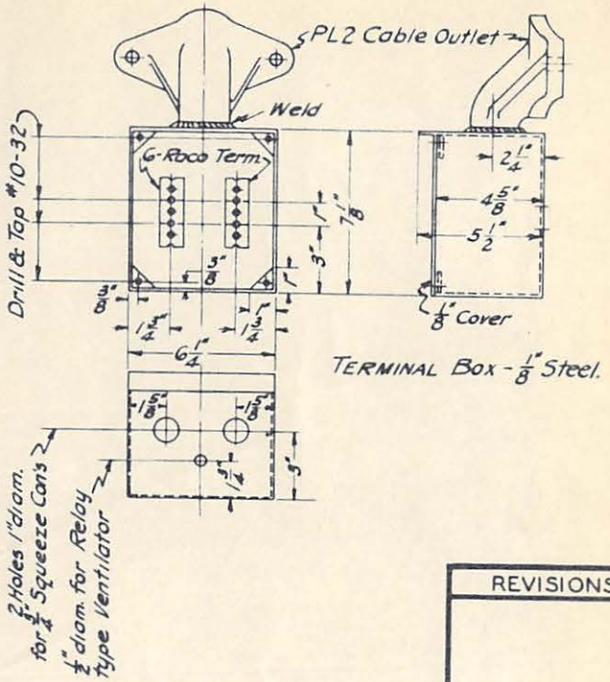
ROANOKE, VA.

FEB. 20, 1948


RECEIVED
NOV 2 1953
ORD. INTER. SERVICE


1¼" Street Ell (Supplied with Sig.)
1¼" to ¾" Bushing
¾" Squeeze Con.
5 Cond. N.S. Jacket Cable. Apply Friction Tape around this cable where it enters squeeze connectors in order to increase diam. and make tight fit in connector.
Terminal Box, See Detail
Platform - Make from Part 8, E-635-A, Sh. 5.
2'-0"
2'-3"
1'-10"
1'-9"
1'-9"
3'-2"
℄ Signal to Top of Foundation (Specify when ordering)





REVISIONS

SHEET 1 OF 1 E-687-A

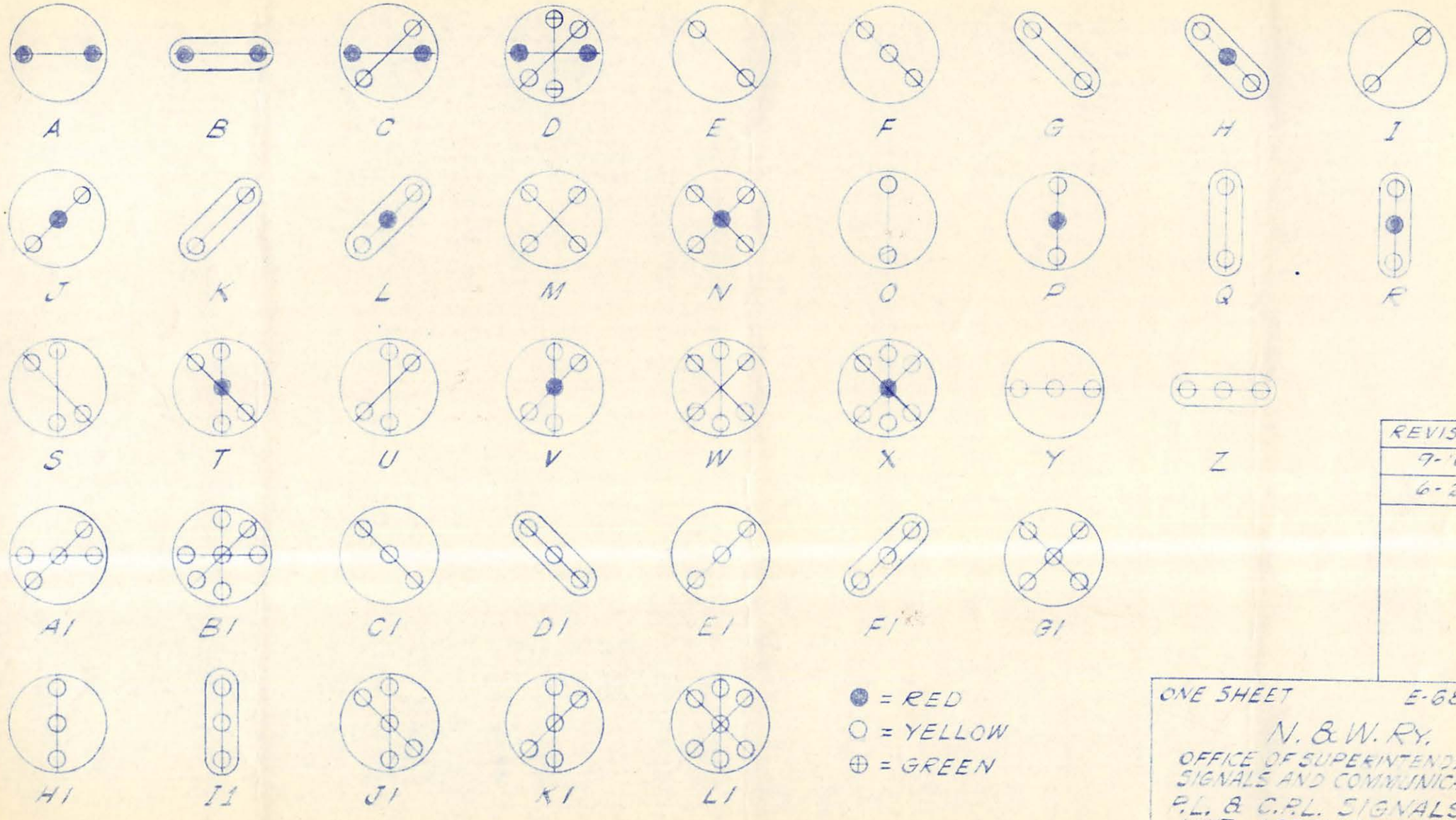
N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

SIGNALS - TRAIN ORDER AND SWITCHING WITH R2 UNITS

ROANOKE, VA. OCT. 22, 1948.

E-687-A



REVISIONS
9-10-58
6-2-60

ONE SHEET E-689-A

N. & W. RY.
OFFICE OF SUPERINTENDENT
SIGNALS AND COMMUNICATIONS
P.L. & C.P.L. SIGNALS
UNIT ASSEMBLIES.
ROANOKE, VA FEB. 1, 1949

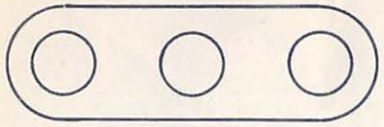


FIG. 1

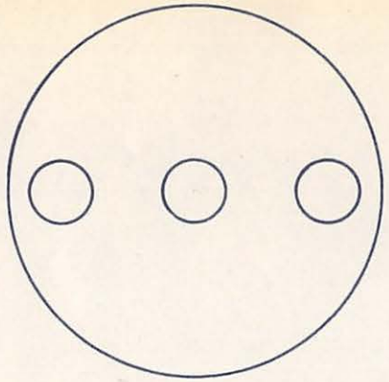


FIG. 2

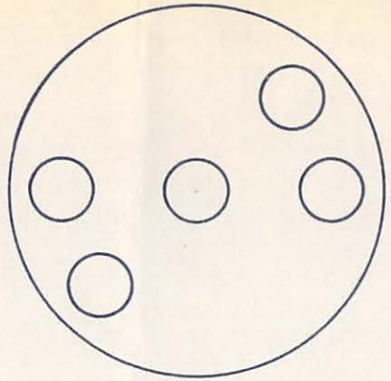


FIG. 3

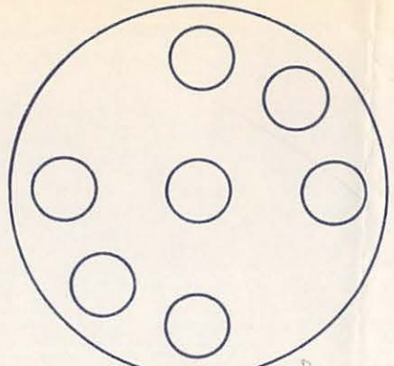


FIG. 4

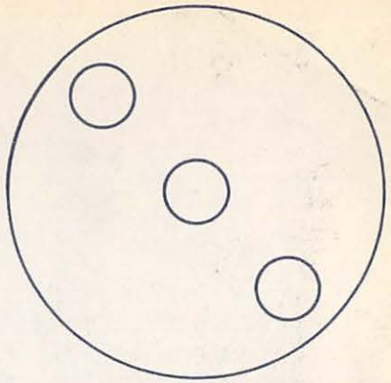


FIG. 5

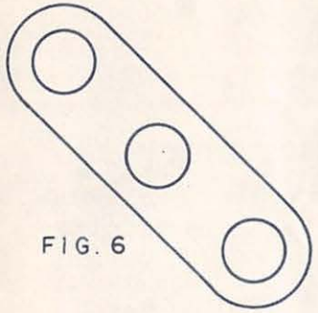


FIG. 6

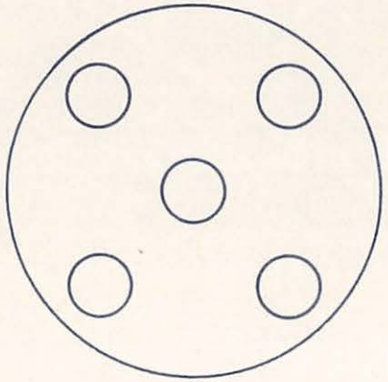


FIG. 7

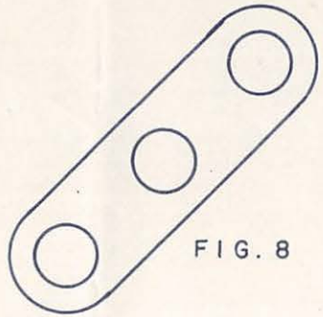


FIG. 8

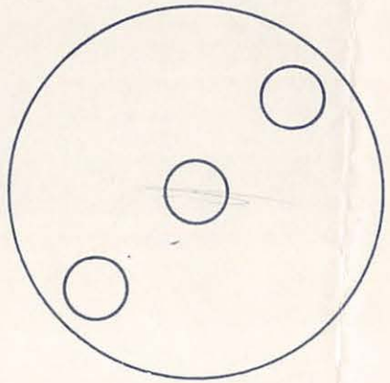


FIG. 9

FIG. 10

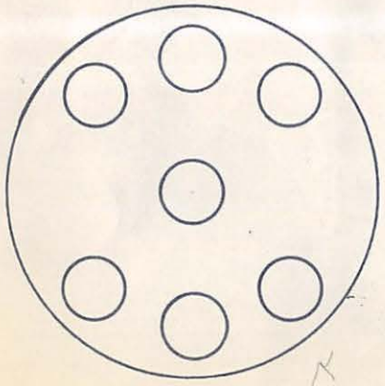


FIG. 11

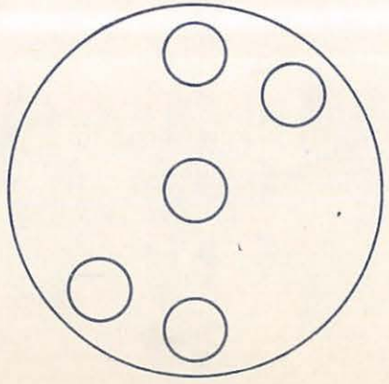


FIG. 12

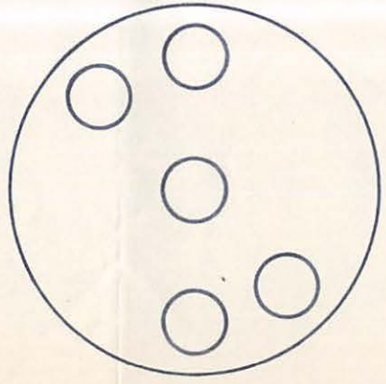


FIG. 13

REVISIONS
3-14-51
5-7-51
3-20-53

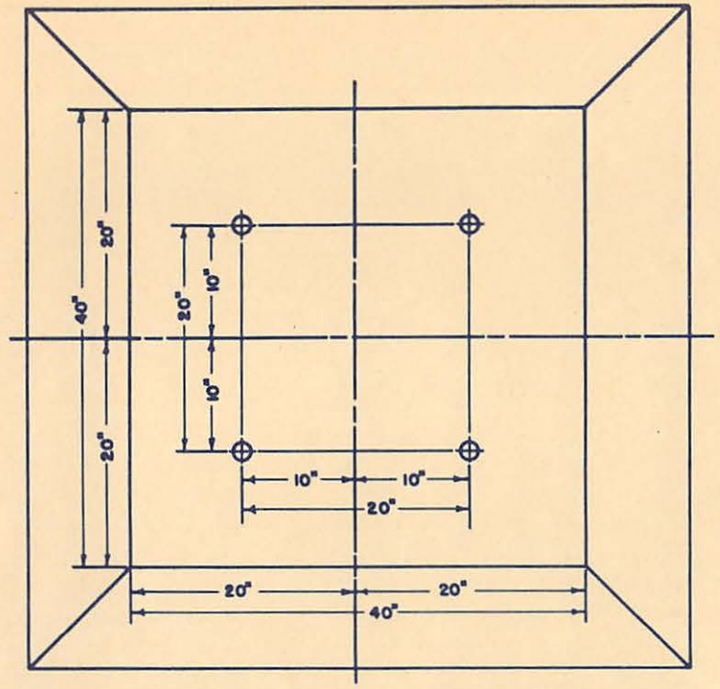
ONE SHEET E-689-A

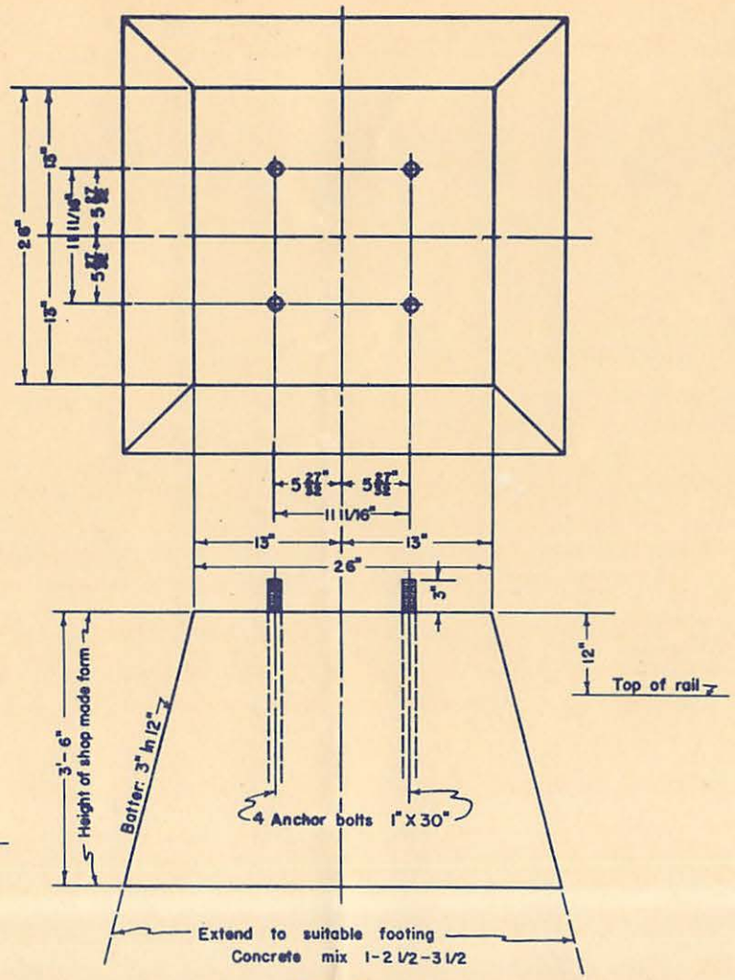
N. & W. RY.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

POSITION LIGHT SIGNALS UNIT ASSEMBLIES

ROANOKE, VA. FEB. 1, 1949





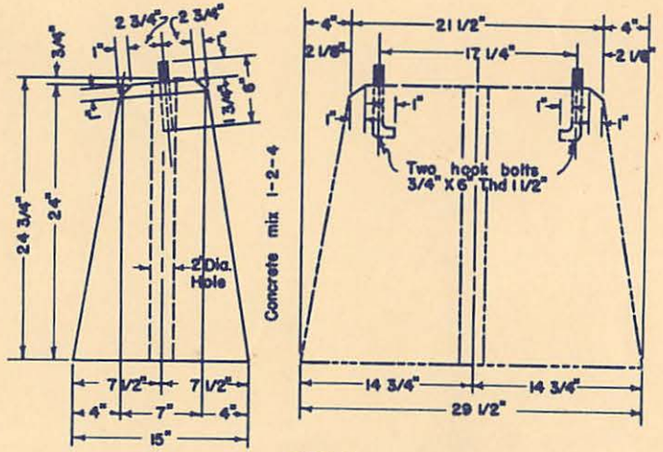


FIG. 1
POSITION LIGHT DWARF SIGNAL FOUNDATION

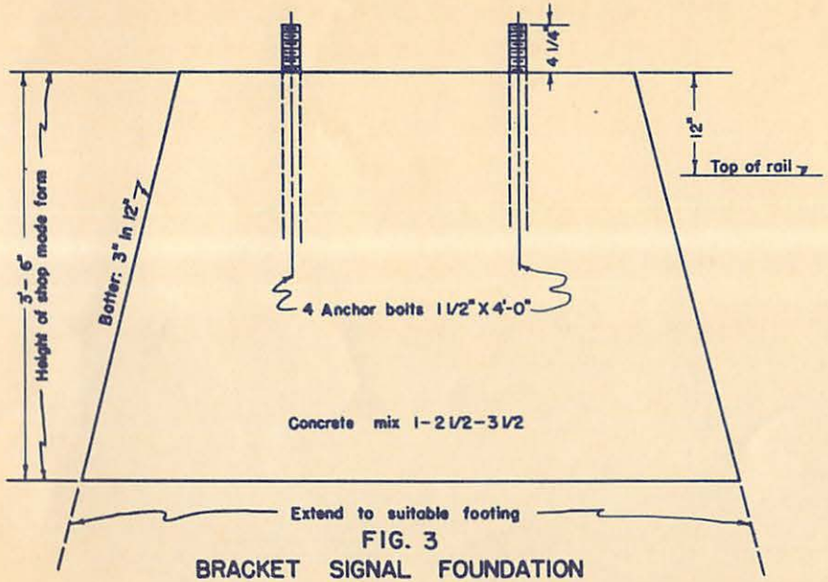


FIG. 3
BRACKET SIGNAL FOUNDATION

FIG. 2
GROUND SIGNAL FOUNDATION

NOTE:
For foundations not shown hereon see—

E-517-A, C.P. Valve and U-Box.
E-641-A, Air Compressor.
E-675-A, Steel Instrument Houses.
E-682-A, Sheet Steel Relay Cases.

REVISIONS

SHEET 1 OF 3 E-690-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

FOUNDATIONS

ROANOKE, VA. JULY 11, 1949

E-690-A

RECEIVED
AUG 23 1949
SPECIFICATION DEPT.

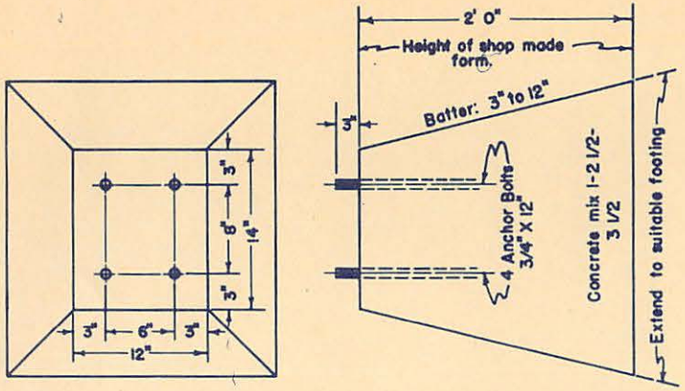
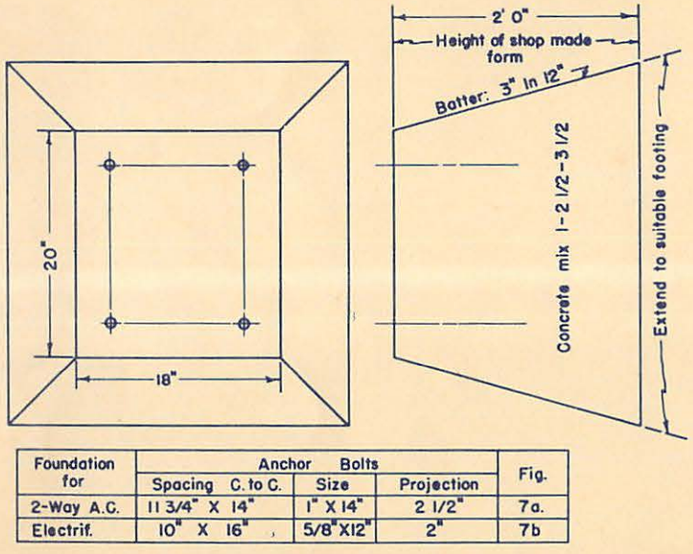
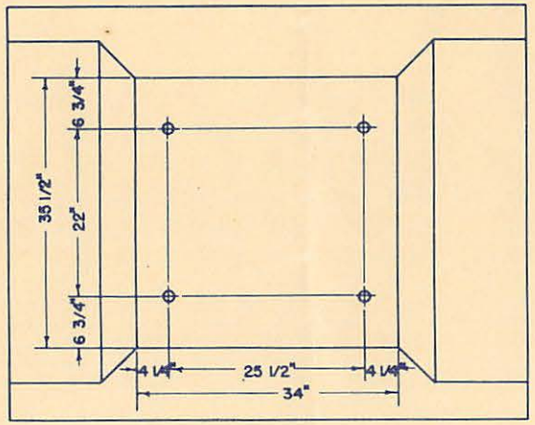


FIG. 6
TWO-WAY D.C. FOUNDATION



Foundation for	Anchor Bolts			Fig.
	Spacing C. to C.	Size	Projection	
2-Way A.C.	11 3/4" X 14"	1" X 14"	2 1/2"	7a.
Electrif.	10" X 16"	5/8" X 12"	2"	7b

FIG. 7a-b
2-WAY A.C. & ELECTRIFICATION FOUNDATION



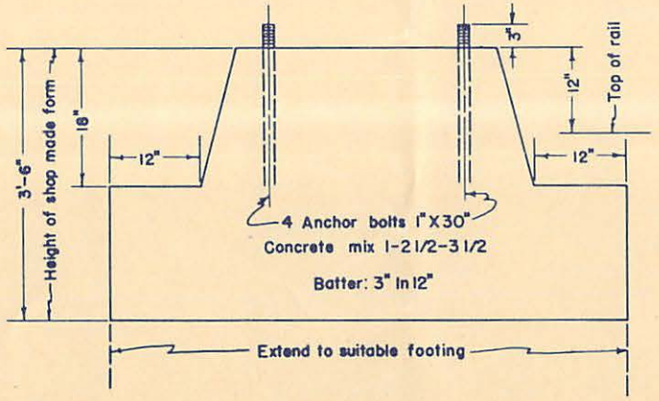
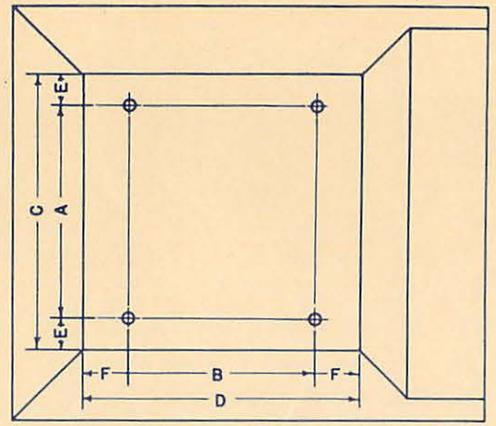


FIG. 5
POSITION LIGHT FOUNDATION



Foundation for	Dimensions in Inches					
	A	B	C	D	E	F
Style "S"	23 7/8	23 7/8	35	33	5 5/8	4 5/8
Low Inst.	19 1/2	19 1/2	35	29	7 3/4	4 3/4

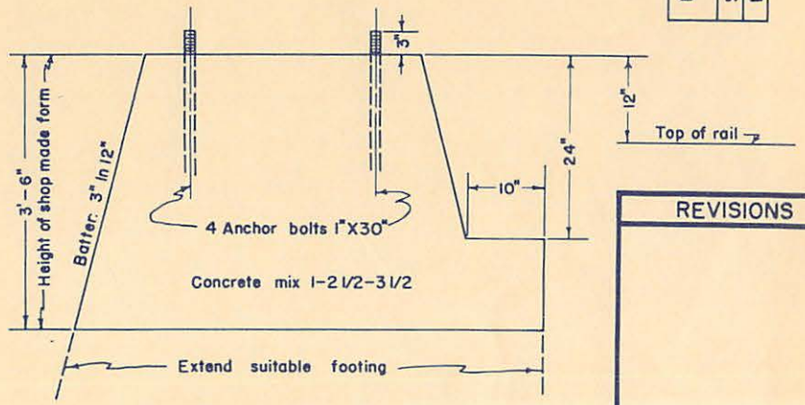


FIG. 4
STYLE "S" & LOW INSTRUMENT CASE FOUNDATION

REVISIONS

SHEET 2 OF 3 E-690-A

N. & W. Ry.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

FOUNDATIONS

ROANOKE, VA. JULY 11, 1949

RECEIVED
AUG 23 1949
SPECIFICATION DEPT.

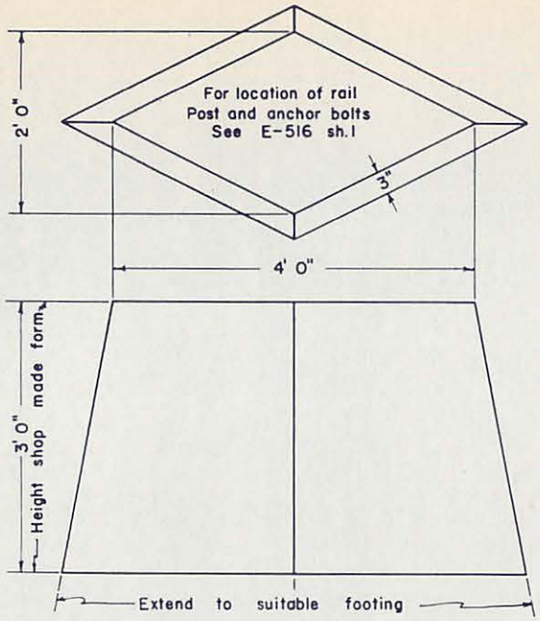


FIG. 10
AUTOMATIC WIG-WAG SIGNAL FOUNDATION
Side of Street Installation

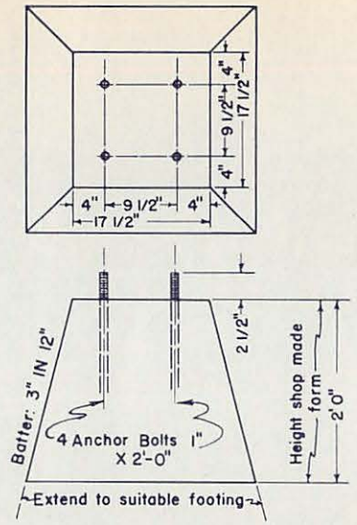


FIG. 9
ILLUMINATED SIGN & FLASHING LIGHT
SIGNAL FOUNDATION

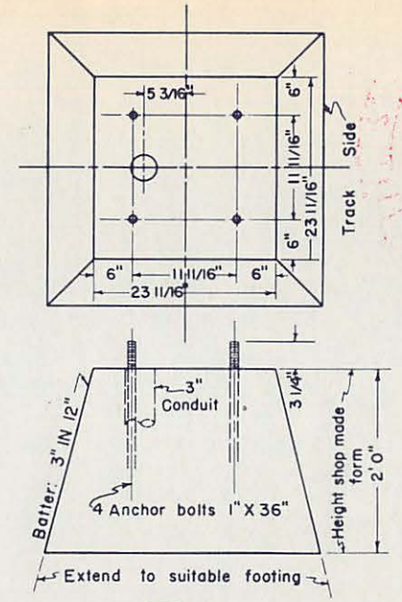


FIG. 8
MOD. 10 XING GATE FOUNDATION

REVISIONS
10-1-53

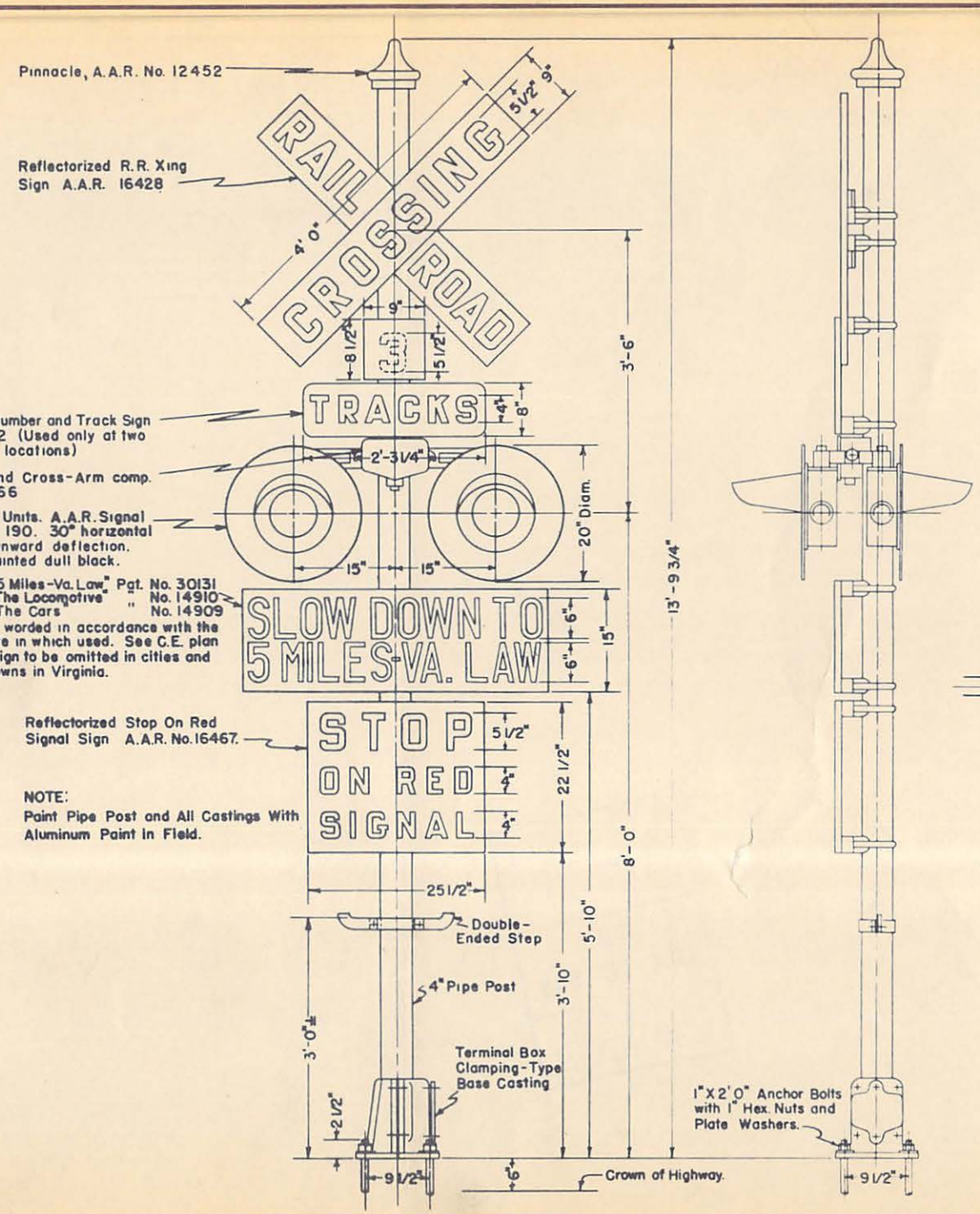
SHEET 3 OF 3 E-690-A

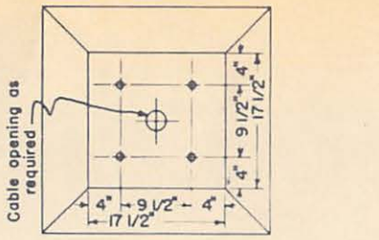
N. & W. Ry.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

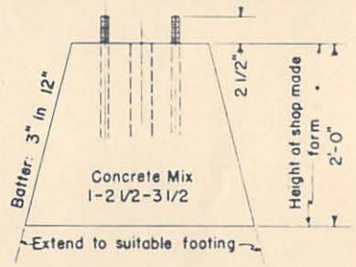
FOUNDATIONS

ROANOKE, VA. JULY 11, 1949

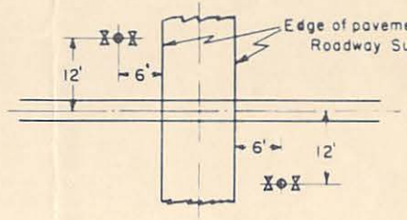
RECEIVED
NOV 2 1953
ORD. INTER. SCI.


Pinnacle, A.A.R. No. 12452
Reflectorized R.R. Xing Sign A.A.R. 16428
RAIL ROAD CROSSING
4'-0"
5 1/2"
9"
9"
8 1/2"
5 1/2"
Reflectorized Number and Track Sign A.A.R. No. 164512 (Used only at two or more track locations)
TRACKS
4"
8"
Junction Box and Cross-Arm comp. A.A.R. No. 16566
2'-3 1/4"
Flashing Light Units. A.A.R. Signal Section Spec. 190. 30" horizontal spread, 15" downward deflection. Backgrounds painted dull black.
Comp. with lamps, 10V. 18W. SCBB, type S11 bulb.
20" Diam.
15"
15"
3'-6"
13'-9 3/4"
"Slow Down To 5 Miles-Va. Law" Pgt. No. 30131
"Look Out For The Locomotive" " No. 14910
"Look Out For The Cars " No. 14909
Note to manufacturer- This sign, as required, to be furnished by railroad
This sign to be worded in accordance with the laws of the state in which used. See C.E. plan L25 revised. Sign to be omitted in cities and incorporated towns in Virginia.
SLOW DOWN TO 5 MILES-VA. LAW
6"
6"
15"
Reflectorized Stop On Red Signal Sign A.A.R. No. 16467.
STOP
ON RED
SIGNAL
5 1/2"
4"
4"
22 1/2"
25 1/2"
8'-0"
NOTE:
Paint Pipe Post and All Castings With Aluminum Paint in Field.
Double-Ended Step
4" Pipe Post
5'-10"
3'-10"
3'-0"±
Terminal Box Clamping-Type Base Casting
2 1/2"
9 1/2"
6"
Crown of Highway.
1"X2'0" Anchor Bolts with 1" Hex. Nuts and Plate Washers.
9 1/2"





FOUNDATION



LOCATION PLAN

REVISIONS
10-14-49 ROW
1-4-50 MDG
5-25-50 ROW
4-25-51 MDG
7-13-51 MDG
8-1-51 MDG

ONE SHEET E-691-A

N. & W. Ry.

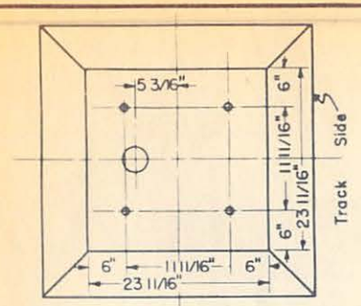
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

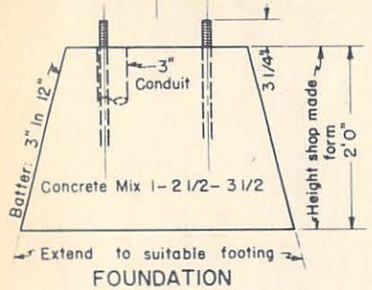
FLASHING LIGHT HIGHWAY CROSSING SIGNAL

ROANOKE, VA. AUGUST 11, 1949

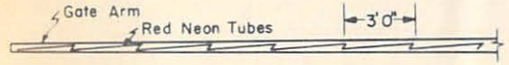
RECEIVED
MAILING DEPT.
AUG 21 1951
P.M.
ns'd
Date

RECEIVED
AUG 22 1951
SPECIFICATION DEPT.

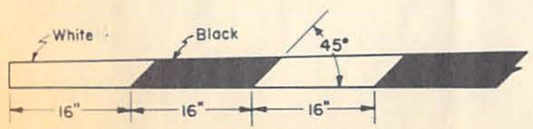




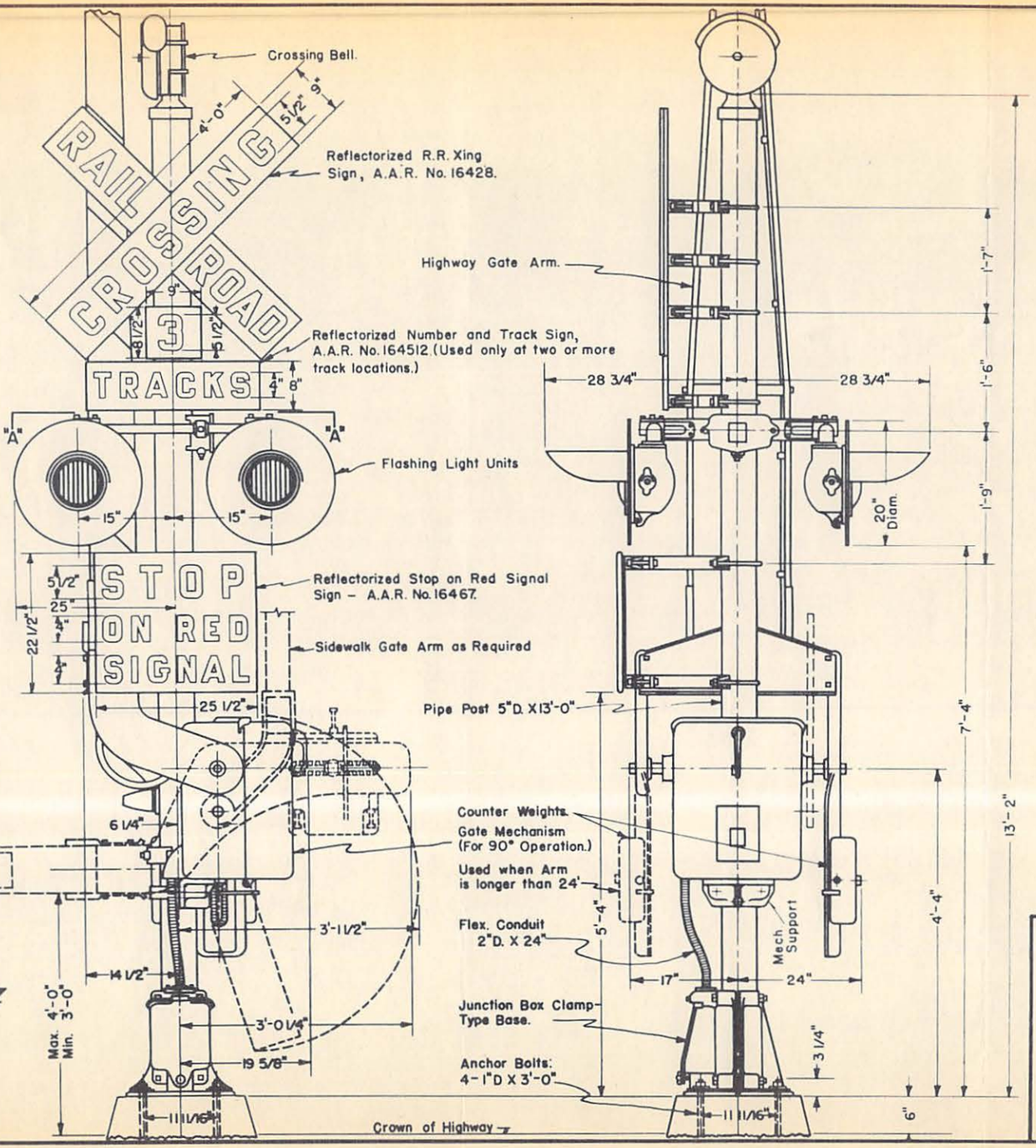
FOUNDATION

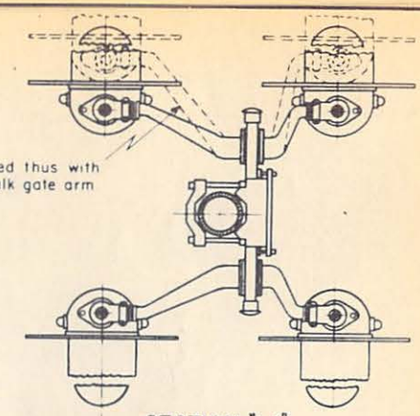


Arrangement of Neon Tubes on Gate Arms. For Details See Sketch 1995.

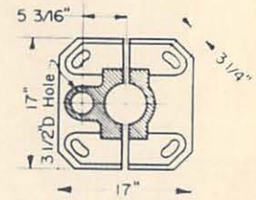


Paint Gate Arms Thus, Both Sides.





SECTION "AA"



PLAN OF BASE CASTING

REVISIONS
1-4-50 M.D.G.
12-10-51 M.D.G.

NOTE:
Paint Pipe Post and all Castings with Aluminum Paint in Field.

ONE SHEET E-692-A

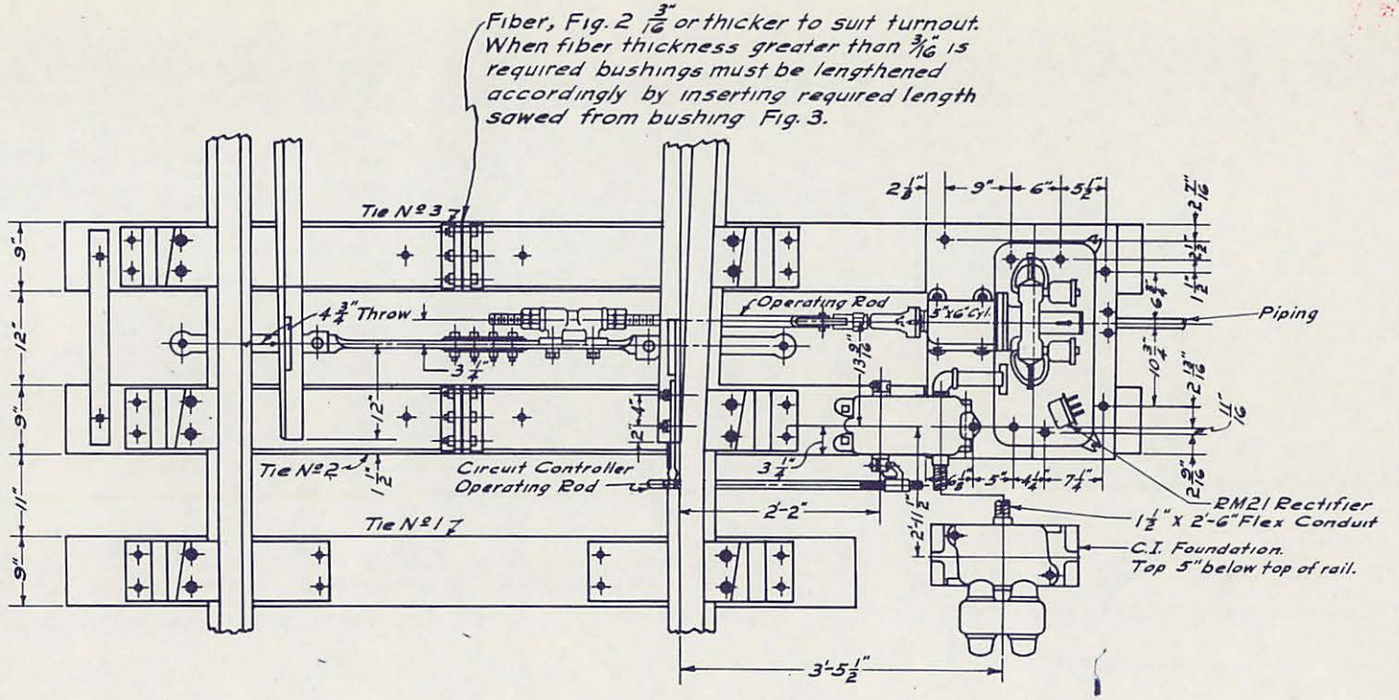
N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

HIGHWAY CROSSING GATES SHORT ARM - MODEL 10.

ROANOKE, VA. AUGUST 26, 1949

RECEIVED
JAN 16 19
SPECIFICATION DEV


Fiber, Fig. 2 3/16" or thicker to suit turnout. When fiber thickness greater than 3/16" is required bushings must be lengthened accordingly by inserting required length sawed from bushing Fig. 3.
Tie No 3
Tie No 2
Tie No 1
4 3/4" Throw
Operating Rod
Circuit Controller Operating Rod
3'-5 1/2"
2'-2"
Piping
RM21 Rectifier
1 1/2" x 2'-6" Flex Conduit
C.I. Foundation. Top 5" below top of rail.

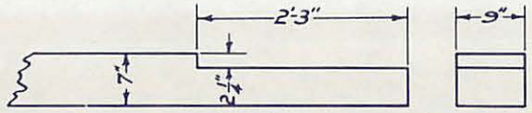


Fig. 1
Framing of 7" X 9" X 11'-6" Ties Nº. 2 & 3.

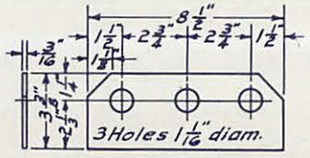


Fig. 2
Gauge Plate Insulating Fiber.

Fig. 3
Fiber Bushing

REVISIONS

ONE SHEET E-693-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT. DIRECT ACTING E.P. SWITCH MOVEMENT

ROANOKE. VA. JULY 6. 1950

RECEIVED
NOV 2 1953
ORD. INTER. SEC.

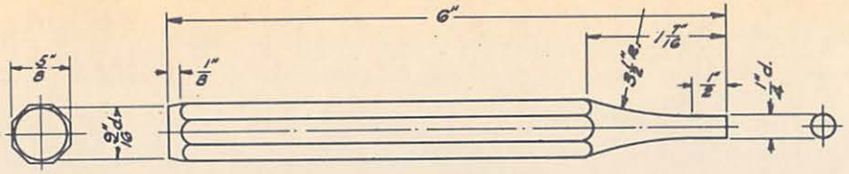



FIG. 1

BONDING PUNCH for RACO Nº 424 BONDS.

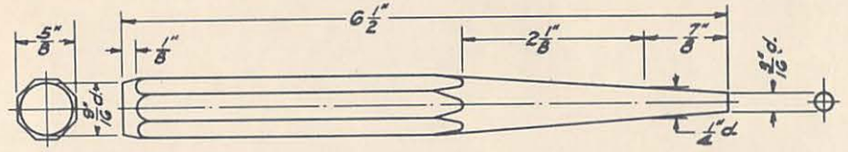


FIG. 2

BONDING PUNCH for RACO Nº 600-7 BONDS.

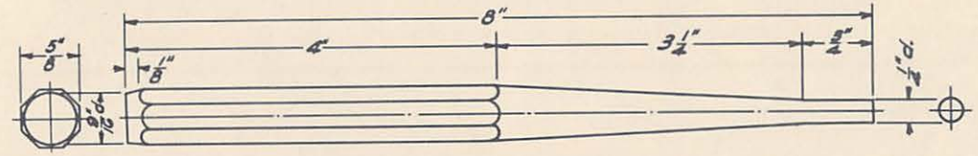


FIG. 3.

BONDING PUNCH - FINISHING.

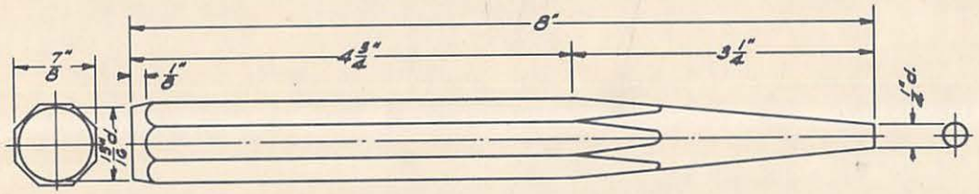


FIG. 4.

BONDING PUNCH - EXTRA HEAVY - STARTING.

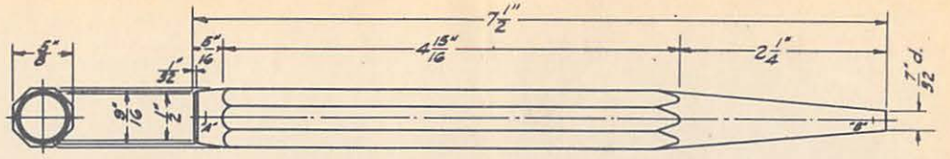


FIG. 5

PIPE RIVET STARTING PUNCH
Steel - Omega Nº 70
Hardness of "A" Rockwell C22-C22 1/2
Hardness of "B" Rockwell C53-C55 1/2

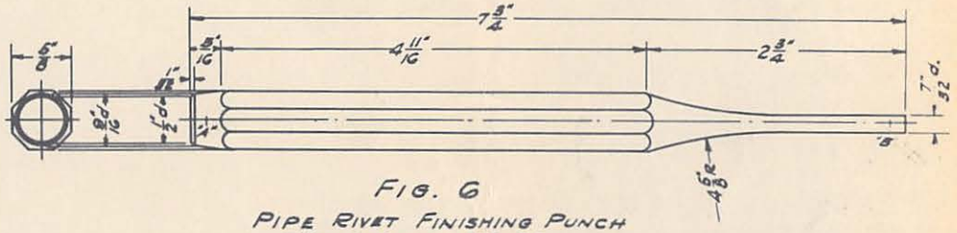



FIG. 6

PIPE RIVET FINISHING PUNCH
Steel - Omega Nº 70
Hardness of "A" Rockwell C19-C20
Hardness of "B" Rockwell C42-C43 1/2

REVISIONS

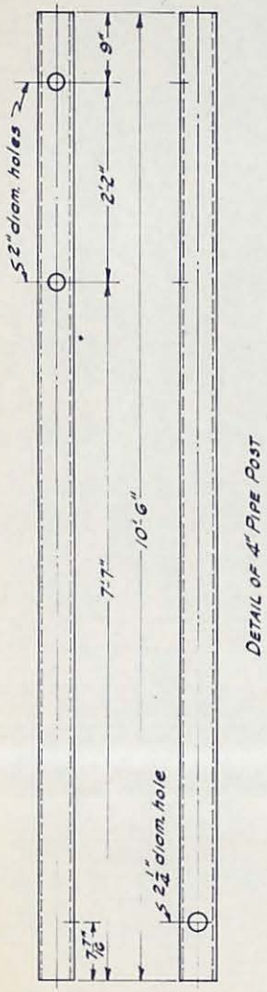
SHEET 1 OF 1 E-696-A

N. & W. RY.

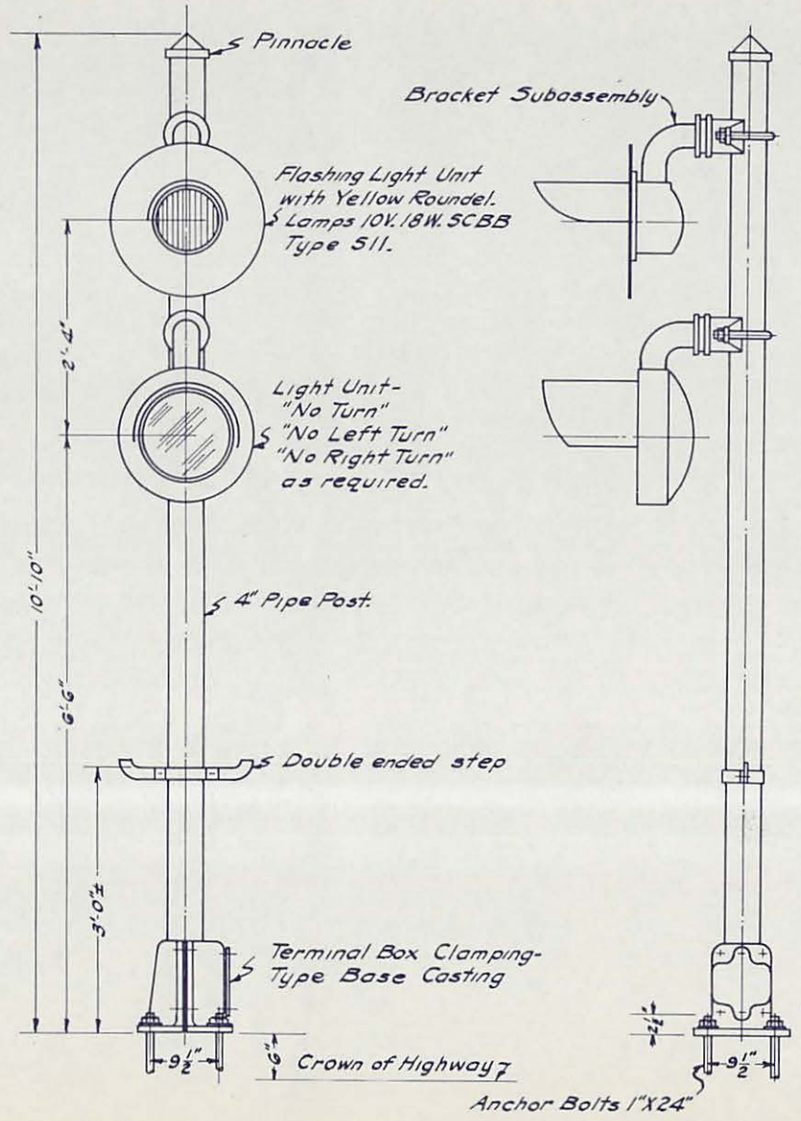
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

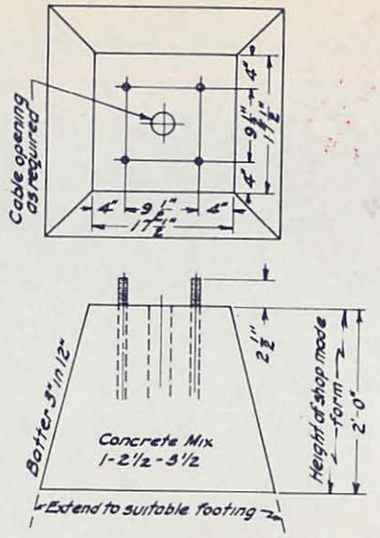
PUNCHES - BONDING AND PIPE RIVET

ROANOKE, VA. NOV. 18, 1952



DETAIL OF 4" PIPE POST





FOUNDATION

REVISIONS

ONE SHEET

E-698-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

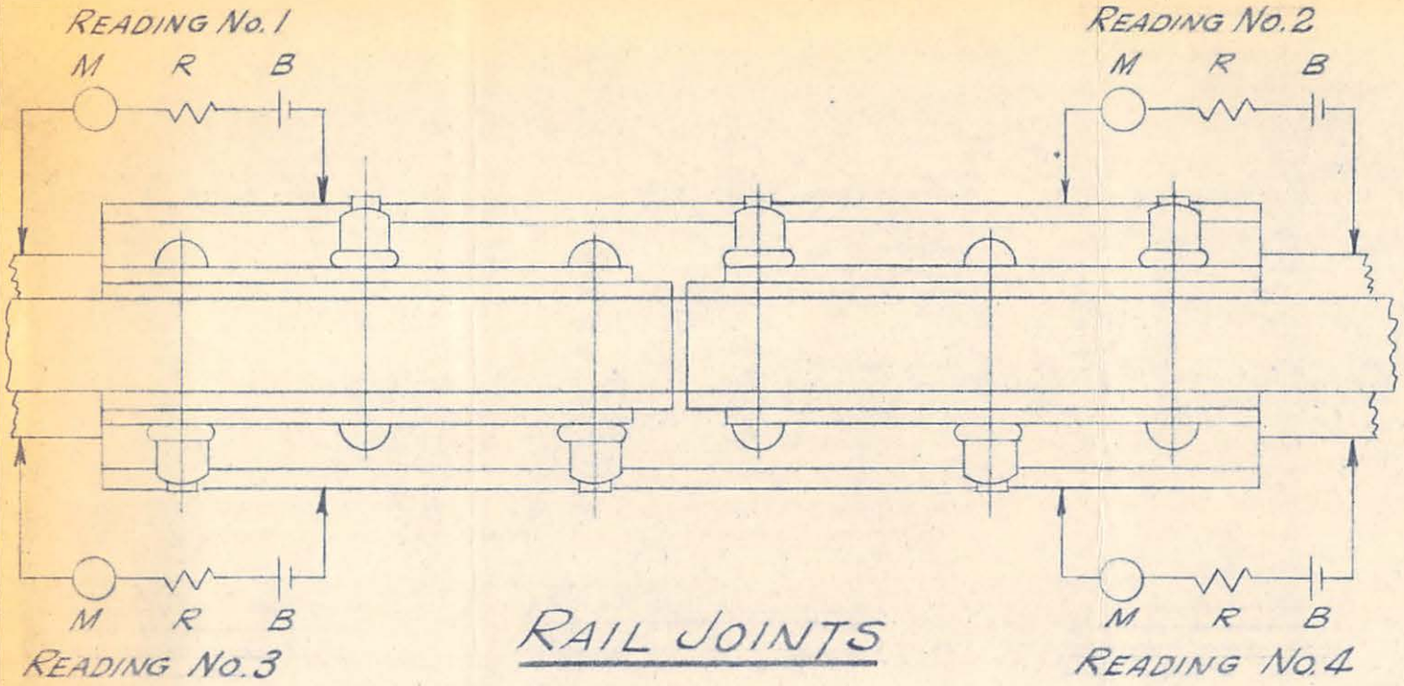
"NO TURN" SIGN

ROANOKE, VA.

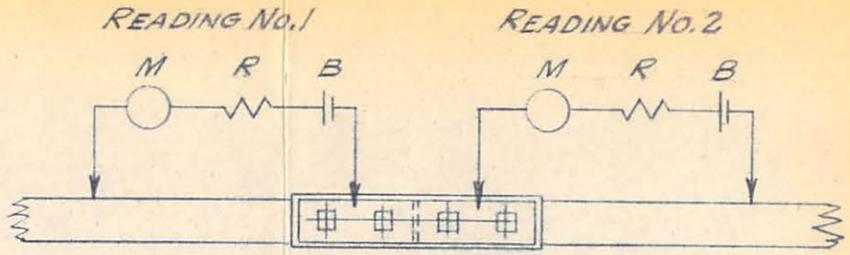
APRIL 10, 1953

E-698-A

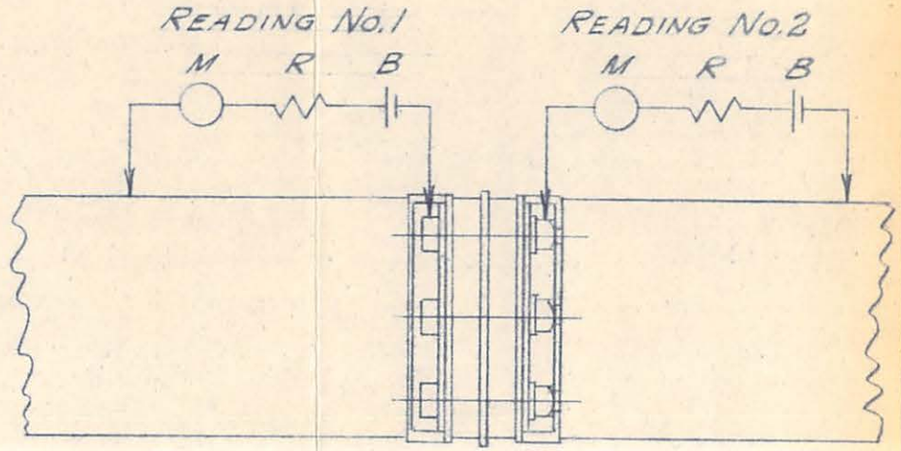
RECEIVED
NOV 2 1953
ORD. INTER. SEC.



RAIL JOINTS



SWITCH RODS



GAUGE PLATE

When TOTAL current reading for insulating rail joints or reading No. 1 or No. 2 for other insulation shown exceeds .020 amperes and track circuit is in difficulty, corrective measures to reduce the leakage are indicated.

To determine TOTAL current reading for insulating rail joint add the higher of readings No. 1 and No. 2 to the higher of readings No. 3 and No. 4

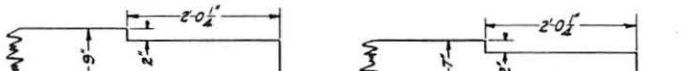
LEGEND
M = D.C. MILLIAMMETER
B = DRY CELL, 1.5 V. APPX.
R = 4 OHM RESISTOR

ONE SHEET E-703-A

N. & W. RY.
OFFICE OF SUPERINTENDENT
SIGNALS AND COMMUNICATIONS

INSULATION TESTS

MAY 14, 1963.



Tie No. 1 - 7"X 9"X 11'-9" Tie No. 2 - 7"X 9"X 11'-9"

FRAMING OF TIES.

Fig. 2.
Fiber Bushing.

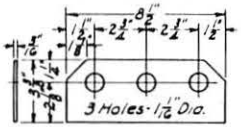
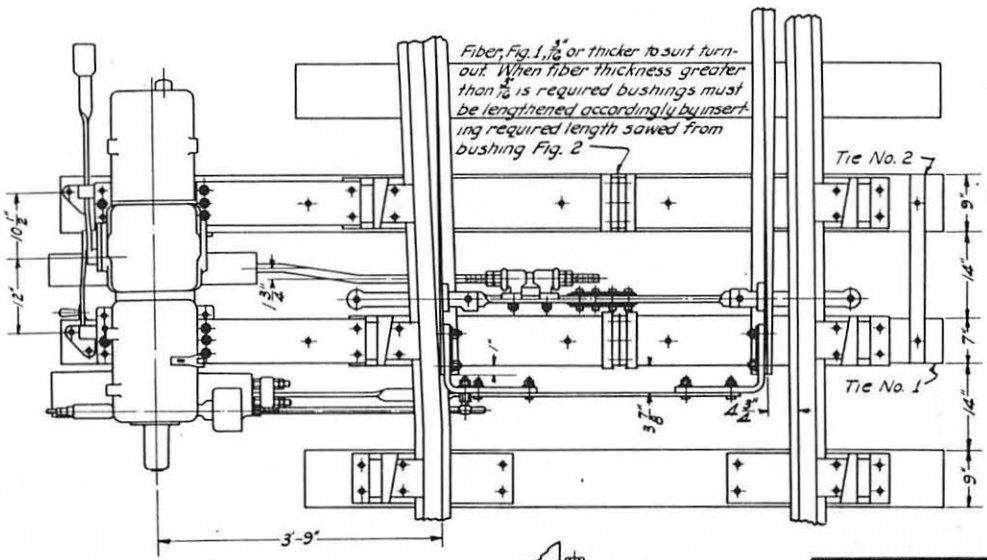
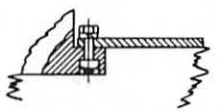


Fig. 1
Gauge Plate Insulating Fiber.



FOR DETAILS OF
OPERATING ROD SEE E-679-A
LOCK RODS SEE E-674-A
POINT DET. ROD SEE E-680-A
FRONT RODS SEE E-659-A
GAUGE PLATES SEE C.E. L382



Method of Attaching Gage Plate to Mort.
2-Dowel Bolts as shown & 1-Bolt thru Tie.

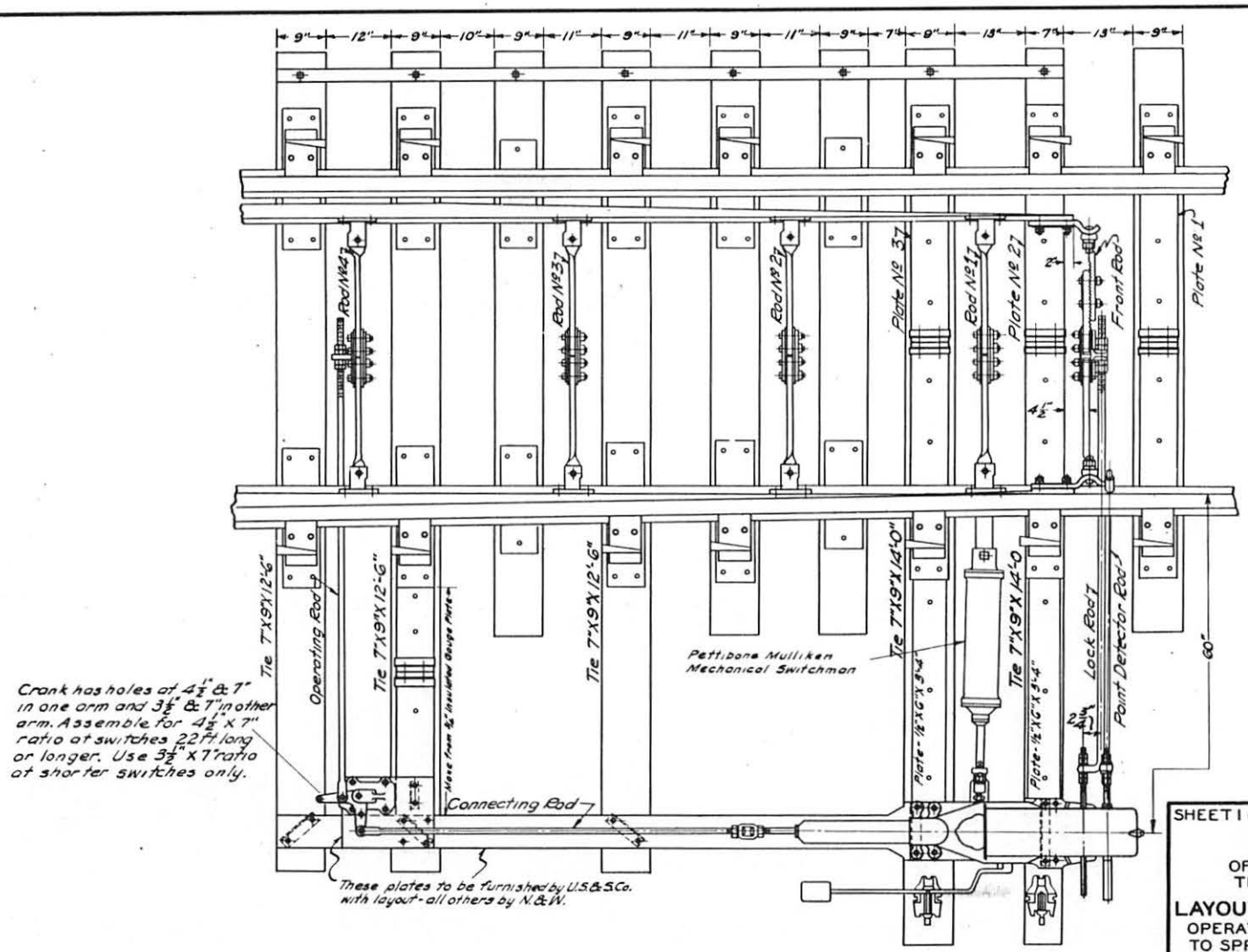
REVISIONS
REV. 7-16-48 M.D.G.
REV. 1-6-53. M.D.S.

ONE SHEET E-684-A

N. & W. Ry.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT, STYLE M22, M23A ELEC. SWITCH MOVEMENT

ROANOKE, VA. OCT. 3, 1947


9" 12" 9" 10" 9" 11" 9" 11" 9" 11" 9" 7½" 9" 13" 7½" 13" 9"
Rod No 47
Rod No 37
Rod No 27
Plate No 37
Rod No 17
Plate No 27
Front Rod
Plate No 1
Tie 7"X9"X12'-6"
Operating Rod
Tie 7"X9"X12'-6"
Tie 7"X9"X12'-6"
Tie 7"X9"X14'-0"
Pettibone Mulliken Mechanical Switchman
Tie 7"X9"X14'-0"
Lock Rod
Point Detector Rod
60"
Plate - ½"X6"X 3'-4"
Plate - ½"X6"X 3'-4"
Connecting Rod
Crank has holes of 4½" & 7" in one arm and 3½" & 7" in other arm. Assemble for 4½" x 7" ratio at switches 22 ft long or longer. Use 3½" x 7 ratio at shorter switches only.
These plates to be furnished by U.S.&S.Co. with layout - all others by N.&W.

REVISIONS
REV. & REDN. 6-30-52

SHEET 1 OF 1 E-650-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

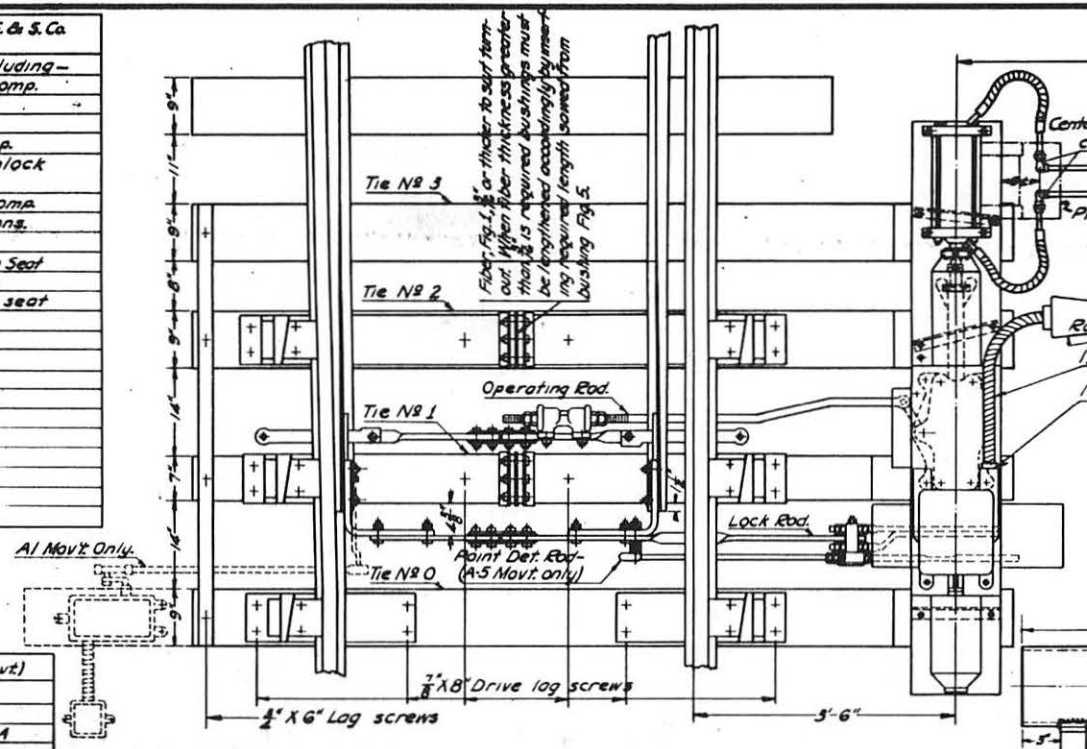
LAYOUT, STYLE S-20 & S-21 MECH.

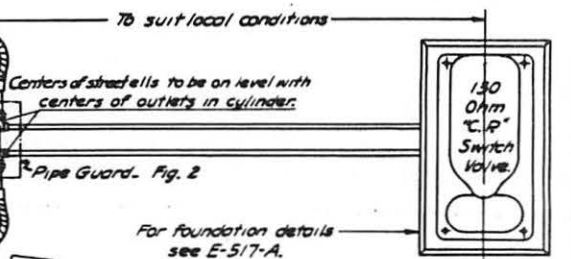
OPERATING FACING POINT LOCK APPLIED TO SPRING SWITCHES.

ROANOKE, VA. FEB. 13. 1952

Items to be furnished by U.S. & S. Co. (for A5 Movt.)	
1	L.H. or R.H. A5 Sw. Movt., including –
	1-Point detector rod ass'y. comp.
	1-Lock rod ass'y. comp.
	1-Front rod ass'y. comp.
	1-R.H. & 1-L.H. sw. foot comp.
	1-Operating rod & cage block ass'y. comp.
	1-130 Ohm C.P. Sw. valve comp.
	2-Armored hose connections.
1	3/4" Pipe Union - Brass to Iron Seat
1	1 1/2" X 1 1/4" Reducing bushing
2	1/2" Pipe Unions - brass to iron seat
1	3/4" X 1/2" Bushing
9	1/2" Ells
1	1/2" Pet cock
3	1/2" Street Ell
1	1/2" Close Nipple
1	Air strainer
2	3/4" Street Ells
1	1/2" X 6" Nipple
1	1/2" X 8" Nipple
1	3/4" X 6" Nipple

Items furnished by R.R. (A5 Movt.)	
1	7" X 9" X 11'-0" Tie. Fig. 3
3	7" X 9" X 11'-0" Ties. Fig. 4
1	C.P. Valve foundation. E-517-A
1	1/2" X 2" X 6'-0" Tie strap
4	3/4" X 6" Lag screws
4	1/2" X 10" Anchor bolts, nuts & wash.
1	1 1/4" X 3'-2" Flex Conduit
2	1 1/4" Squeeze connectors
1	Raco Riser No 464-2
2	Insulating Fibers, Fig. 1
1	Signal padlock
1	Pipe guard - Fig. 2
2	Morden Gauge Plates with drive lag screws for ___# Rail
2	Morden Slide Plates with drive lag screws for ___# Rail
6	Morden Adjustable Rail Braces for ___# Rail.
–	Necessary X-heavy 1/2" pipe for location


Tie No 3
Tie No 2
Tie No 1
Tie No 0
Operating Rod.
Lock Rod.
Point Det. Rod - (A-5 Movt. only)
A1 Movt. Only.
Fiber: Fig. 1, 3/8" or thicker to suit turnout. When fiber thickness greater than 3/8" required washings must be used and cut accordingly by insert ing required length sawed from bushing Fig. 5.
7" X 8" Drive lag screws
1/2" X 6" Lag screws
5'-6"


To suit local conditions
Centers of street ells to be on level with centers of outlets in cylinder.
130 Ohm "C.P." Switch Valve.
Pipe Guard. Fig. 2
For foundation details see E-517-A.
Raco Riser Box No 464-2
1 1/4" Flex. Conduit. 3'2" long
1 1/2" X 1 1/4" Reducing bushing
Height of top of Foundation above ground to suit local conditions.

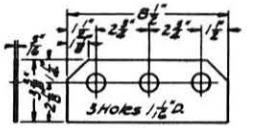


Fig. 1
Gauge Plate Insulating Fiber.

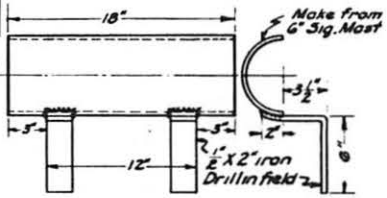


Fig. 2
Pipe Guard
Furnish comp. with 2-1/2" X 2" bolts, nuts and lock washers.

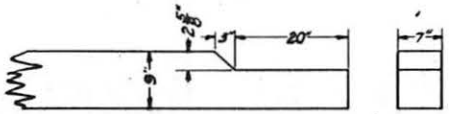


Fig. 3
Framing of Tie No 1

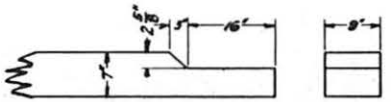


Fig. 4
Framing of Ties No 0, 2, 3.

Note –
Framing of ties identical for A1 and A5 Movts. Tie No 0 to be 7" X 9" X 13'-0" for A1 Movt. All other ties 7" X 9" X 11'-0".

Fig. 5
Fiber Bushing.

REVISIONS
REV. & REDN. 2-20-46
REV. 4-15-46. M.D.G.
REV. 9-27-47. M.D.G.
REV. 10-6-47. M.D.G.
REV. 3-11-48. M.D.G.
REV. 7-15-48. V.D.J.
REV. 6-24-49 M.D.G.

ONE SHEET E-649-A

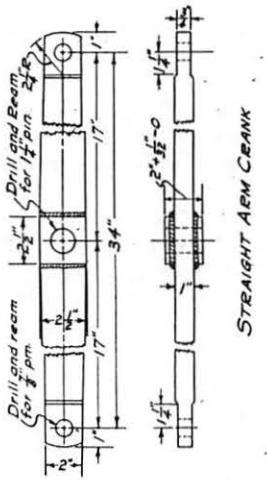
N. & W. Ry.

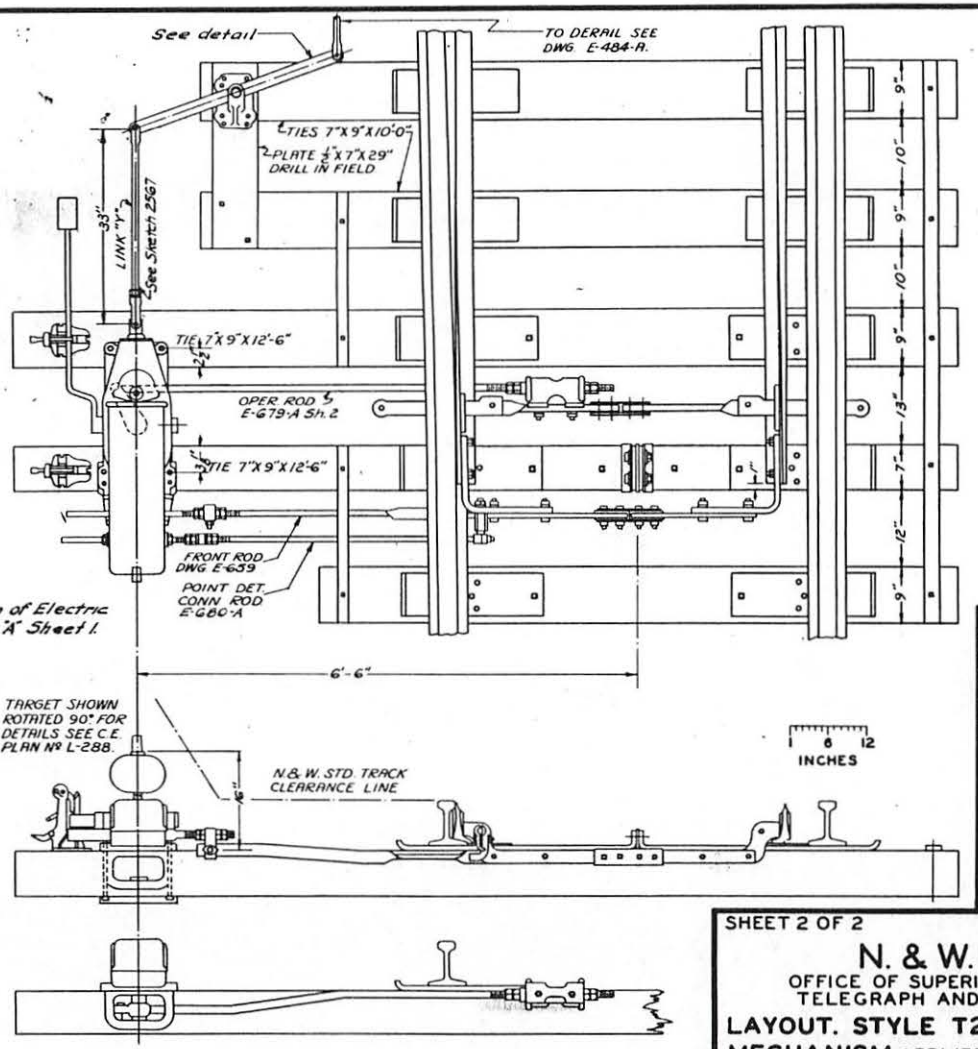
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT. STYLE A1 & A5 E.P. SWITCH MOVEMENTS

ROANOKE, VA. FEB. 8, 1940

To be furnished by U.S. & S. Co. – RH or L.H. T21 switch mechanism for applying to 131# R.E. rail, single switch, with SL-21A electric lock.	
1	T21 Sw. Mech. with low stand.
1	Target, N&W Std. yellow, comp. with bolts, nuts & lock washers.
1	9 7/8" Angle washer.
1	12 1/4" Angle washer.
1	Lever Latch Stand, less lag screws
1	Sw. Point adjusting block.
1	Oper. Rod 6'-5-3/4" long, comp. with pin and cotter.
1	Lock Rod
1	Lock Rod connecting lug.
1	Point Detector Rod
1	Pt. Det. Connecting Rod
1	Pt. Det Rod Stud, comp.
1	Front Rod, comp.
1	L.H. Sw Foot with point bolts
1	R.H. Sw Foot with point bolts
1	SL21A Elec Lock with lever lock rod & crank, less lag screws.
1	1 1/4" Conduit system.
Items below furnished by R.R.	
1	1/2" X 2 1/2" X 7'-3" Tie Strap.
2	1/2" X 2 1/2" X 2'-4" Tie Strap
11	3/4" X 6" Lag screws
2	3/4" X 9" Bolts (Comp with nuts and 2 3/4" X 11" Bolts lock washers)
1	Raco Term. Box # 464-1, 8 way or # 464-2, 12 way
1	1 1/4" X 12" Flex. conduit
2	7" X 9" X 12'-6" treated oak ties.
Gauge plates, rail braces, derail connections and 10'-0" ties must be ordered seperately as required.	





Note-
For application of Electric Lock see View "A" Sheet 1.

REVISIONS	
REV & RED'N 11-23-44.	
REV. 5-18-45.	M.D.G.
REV. 1-30-46.	M.D.G.
REV. 5-18-49.	M.D.G.
REV. 6-13-50	M.D.G.
REV. 0-.-53	M.D.G.

SHEET 2 OF 2 E-637-A

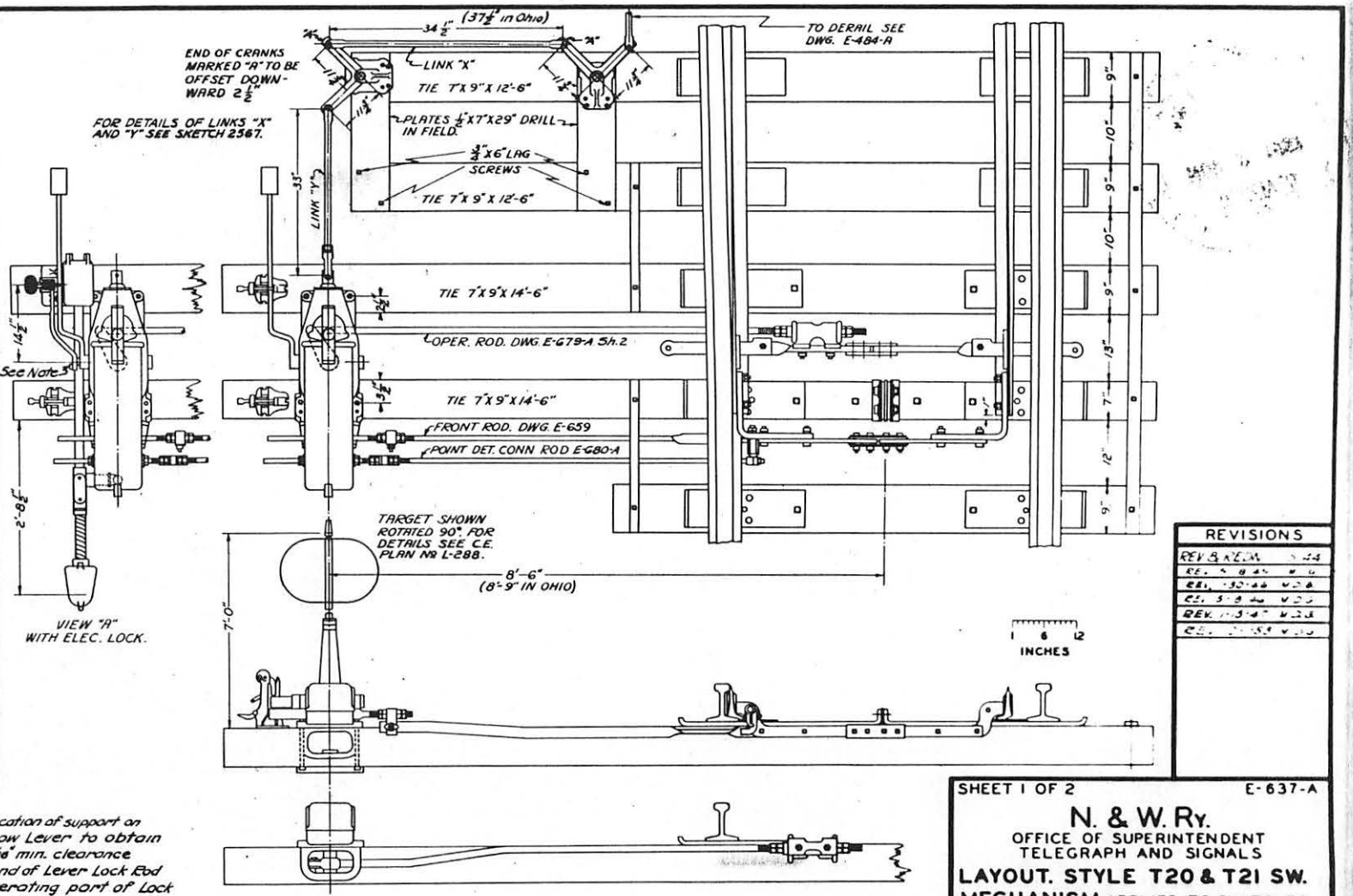
N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT. STYLE T20 & T21 SW. MECHANISM APPLIED TO SWITCHES AND DERAILS. LOW. STAND.

ROANOKE. VA. MAR. 6. 1939

P-FILE NO. 1648


34½" (37½" in Ohio)
END OF CRANKS MARKED "A" TO BE OFFSET DOWN-WARD 2½"
LINK "X"
TIE 7"X 9"X 12'-6"
PLATES ½"X7"X29" DRILL IN FIELD.
¾"X6" LAG SCREWS
TIE 7"X 9"X 12'-6"
FOR DETAILS OF LINKS "X" AND "Y" SEE SKETCH 2567.
LINK "Y"
33"
TIE 7"X 9"X 14'-6"
OPER. ROD. DWG. E-679-A Sh. 2
TIE 7"X 9"X 14'-6"
FRONT ROD. DWG. E-659
POINT DET. CONN ROD E-680-A
TO DERAIL SEE DWG. E-484-A
See Note 3
VIEW "A" WITH ELEC. LOCK.
TARGET SHOWN ROTATED 90°. FOR DETAILS SEE C.E. PLAN No L-288.
8'-6" (8'-9" IN OHIO)
7'-0"
INCHES

To be furnished by U.S.&S.Co. - RH or LH. T21 switch mechanism for applying to 131# R.E. rail, single switch with SL-21A electric lock.	
1	T21 Sw Mech with high stand
1	Target, N&W Std. yellow, comp. with bolts, nuts & lock washers.
1	9⅞" Angle washer.
1	12¼ Angle washer.
1	Lever Latch Stand, less lag screws
1	Sw Point adjusting block.
1	Oper. Rod 8'-5¾ long, comp. with pin and cotter.
1	Lock Rod
1	Lock Rod connecting lug.
1	Point Detector Rod
1	Pt Det Connecting Rod
1	Pt. Det Rod Stud, comp.
1	Front Rod, comp.
1	L.H Sw Foot with point bolts
1	R.H Sw Foot with point bolts
1	SL 21A Elec. Lock with lever lock rod & crank, less lag screws
1	1¼" Conduit system
Items below furnished by R.R.	
1	½" X 2½" X 7'-3" Tie Strap
2	½" X 2½" X 2'-4" Tie Strap
13	¾" X 6" Lag screws
2	¾" X 9" Bolts (Comp. with nuts and
2	¾" X 11" Bolts lock washers)
1	Raco Term. Box #464-1, 8 way or #464-2, 12 way
1	1¼" X 12" Flex. conduit
2	7" X 9" X 14'-6" treated oak ties.
Gauge plates, rail braces, derail connections and 12'-6" ties must be ordered seperately as required.	

Note-
Adjust location of support on Hand-Throw Lever to obtain 1/8" max., 1/16" min. clearance between end of Lever Lock Rod and co-operating part of Lock Pedal. Pivot Bolt in support should be ¾" max., ½" min. from center of Hand-Throw Lever Shaft.

REVISIONS
REV. B. N.Y.C.M. [illegible]
REV. [illegible]
REV. [illegible]
REV. [illegible]
REV. [illegible]
REV. [illegible]

SHEET 1 OF 2 E-637-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT. STYLE T20 & T21 SW. MECHANISM APPLIED TO SWITCHES AND DERAILS. HIGH STAND.

ROANOKE, VA. MAR. 6, 1939

P-FILE NO. 1648

Items to be furnished by U.S. & S. Co.	
1	L.H. or R.H. A21 Dual Sw. Movt. including–
	1-Point Detector Rod Ass'y. Comp.
	1-Lock Rod Ass'y. Comp.
	1-Front Rod Ass'y. Comp.
	1-R.H. & 1-L.H. Sw. Foot Comp.
	1-Operating Rod & Cage Block Ass'y. Comp.
	1-130 Ohm C.P. Sw. Valve Comp.
	1-6'-3" Tie Strap with lag screws.
	2-2'-4 1/2" Tie Strap with lag screws.
	2-Armored Hose Connections
1	3/4" Pipe Union - Brass to Iron Seat
2	1/2" Pipe Unions - Brass to iron seat
1	3/4" to 1/2" Bushing
11	1/2" Ells
1	1/2" Pet Cock
1	1/2" Street Ell
1	1/2" Close Nipple
3	1/2" X 6" Nipples
1	Air Strainer
2	3/4" Street Ells
1	1/2" X 8" Nipple
1	3/4" X 6" "

Items to be furnished by N. & W. Ry.	
2	7"X9"X12' Ties, Fig. 4
1	U-Box (Pipe Housing)
1	C.P. Valve Foundation
1	Cover for U-Box, Fig. 3.
4	1/2" X 10" Anchor bolts with nut and washer
4	1/2" X 5" Anchor bolts with nut and washer
1	1 1/4" X 26" Flex. Conduit
1	1 1/4" Squeeze Connectors
1	Raco Riser No 464-2
2	Insulating Fibers, Fig. 1.
2	Switch Padlocks
2	Signal Padlocks
2	Morden Gauge Plates Comp. with drive lag screws for __# Rail
2	Morden Slide Plates Comp. with drive lag screws for __# Rail
6	Morden Adjustable Rail Braces for __# Rail
–	Necessary X-heavy, 1/2" Pipe for location.
1	Tie Strap 1/2" X 2" X 2'-5"
2	Drive lag screws, 1/2" X 4 1/2"
1	U-Bolt complete, Fig. 6.

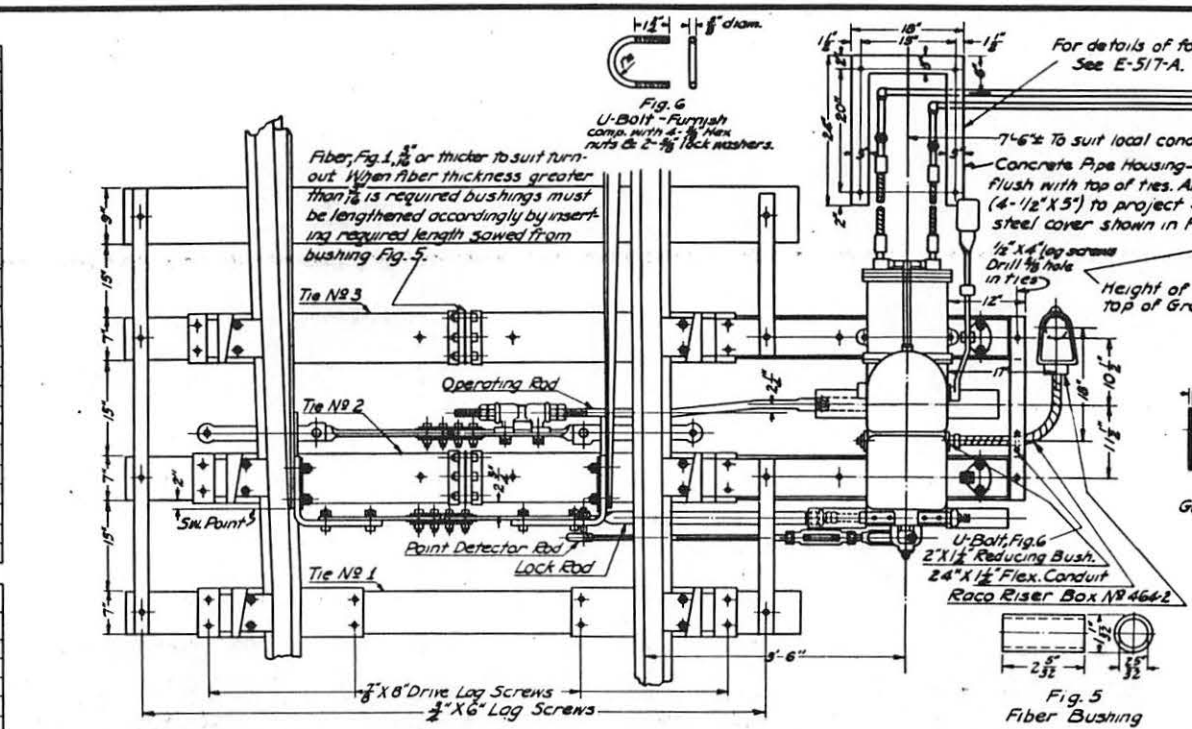

Fiber, Fig. 1, 3/16" or thicker to suit turn-out. When fiber thickness greater than 3/16" is required bushings must be lengthened accordingly by inserting required length sawed from bushing Fig. 5.
Tie No 3
Operating Rod
Tie No 2
Sw. Points
Point Detector Rod
Lock Rod
Tie No 1
7"X8" Drive Lag Screws
1/2"X6" Lag Screws
5'-6"
For details of foundations See E-517-A.
7'-6" ± To suit local conditions
Concrete Pipe Housing - Top to be flush with top of ties. Anchor bolts (4-1/2"X5") to project 3/16". Sheet steel cover shown in Fig. 3.
1/2"X4" lag screws Drill 9/16" hole in ties
Height of top of Foundation above top of Ground to suit local conditions.
130 Ohm "C.P." Switch Valve.
U-Bolt, Fig. 6
2"X1 1/2" Reducing Bush.
24"X1 1/2" Flex. Conduit
Raco Riser Box No 464-2

Fig. 6
U-Bolt - Furnish comp. with 4-5/8" Hex. nuts & 2-5/8" lock washers.

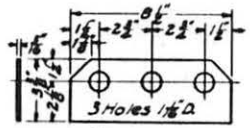


Fig. 1
Gauge Plate Insulating Fiber.

Fig. 5
Fiber Bushing

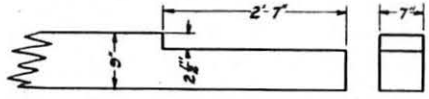
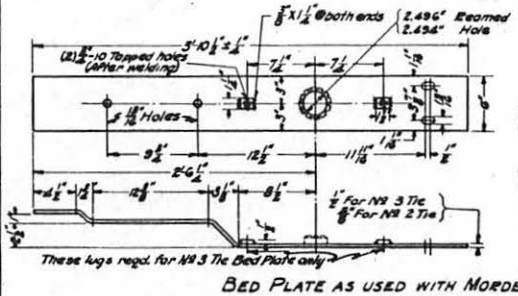
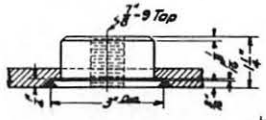


Fig. 4.
Framing of 7"X9"X12'-0" Ties No 2 & 3.



BED PLATE AS USED WITH MORDEN GAUGE PLATES.
Fig. 2.



Enlarged View of Dowel. Press in Plate and Weld all around on bottom.

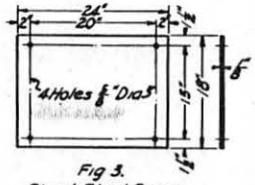


Fig 3.
Sheet Steel Cover for Pipe Housing.

REVISIONS
REV. & REDN. 2-5-46.
REV. 3-21-46. M.D.G.
REV. 4-15-46. M.D.G.
REV. 10-16-47. M.D.G.
REV. 3-11-48. N.D.G.
REV. 7-16-48. N.D.G.
REV. 6-2-49. M.D.G.

ONE SHEET E-591-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT. STYLE A21 E.P. SWITCH MOVEMENT

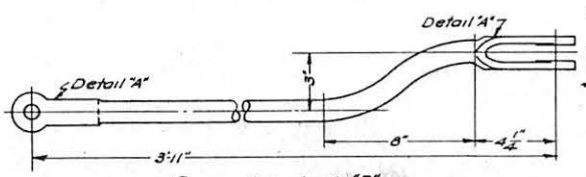
ROANOKE, VA. JUL. 7. 1936

UNITS REQUIRED PER ASSEMBLY										
Switch Connection No. 1	Switch Connection No. 2	Switch Connection No. 3	Switch Connection No. 4	Figure No. 1	Figure No. 2	Figure No. 3	Figure No. 4	Figure No. 5		
				1		1	1	2	Lazy Jack Compensator	
		1							Straight Arm Crank, E-637-A, Sh. 2	
1	1		2	1	3	1		3	11-3/4" x 11-3/4" 90° One Way Horiz. Crank	
							1	1	One Way Bolt Lock, complete	
				2	4	3	2	6	1¼" Solid Jaw, complete	
1	1	1	1	1	3	2	2	6	1¼" Screw Jaw, complete	
1									Connecting Link D (Inc. 1¼" Pin & Cotter)	Sh. 3
	1							1	*Connecting Link E (For 130# or 131# Rail)	Sh. 3
	*							*	Connecting Link K (For 100# Rail)	Sh. 3
			1						Connecting Link X - Sketch 2567	Sh. 3
		1	1						Connecting Link Y - Sketch 2567	Sh. 3
	1							1	**Connecting Plate H (For 130# or 131# Rail)	Sh. 3
	**							**	Connecting Plate J (For 100# Rail)	Sh. 3
									~~Crank Plate A - ½" x 7" x 29"~~	
									~~Crank Plate B - ½" x 7" x 29"~~	
				1		1	1	2	Compensator Plate F - ½" x 9" x 30"	Sh. 3
							1	1	Bolt Lock Plate G - ½" x 7" x 34"	Sh. 3
				1				1	Derail Rod - Dwg. E-681-A, Fig. 1	
				1	1	1	1	2	Pipe Line Insulation	
				250	270	260	260	325	Ft. 1" Galv. Pipe, Plugged & Riveted	
				30	30	30	30	43	Strap Pipe Carrier	
						1	1	2	One Way Transverse Pipe Carrier	
							1	1	Front Rod, Dwg. E-659, Assembly No. 2	
							1	1	Right Hand Switch Foot	
							1	1	Left Hand Switch Foot	
2	2	2	6	4	6	4	4	12	3/4" x 11" Bolt, Threaded Both Ends	
							4	4	3/4" x 4½" Special Thin Head Bolt	
2	2	2		2	6	2	2	8	3/4" x 2½" Bolt	
6	6	6	12	10	18	10	18	40	3/4" Hex Nut	
2	2	2	6	4	6	4	4	12	3/4" Plate Washer	
4	4	4	6	6	12	6	14	28	3/4" Lock Washer	
1	2	2	4	2				4	7/8" x 2¼" C. H. Pin	
1	2	2	4	2				4	3/16" x 1½" Cotter Key	
				2#	2#	2#		3#	Pipe Rivets	
				60	60	60	60	86	½" x 2½" Lag Screw	
2		2	6	4	6	6	6	16	3/4" x 6" Lag Screw	
10	10			20	20	20	30	60	Ft. ½" x 2" Strap Iron	
1	1			4	4	4	2	8	7" x 9" x 10'0" Treated Oak Tie	
							4	4	3/4" x 3-3/4" Bolts	
									~~Crank Plate Fig. 1 - Sh. 3~~	
1	1	1	2	1	3	1		3	Universal Crank Plate "A", Sh. 3	

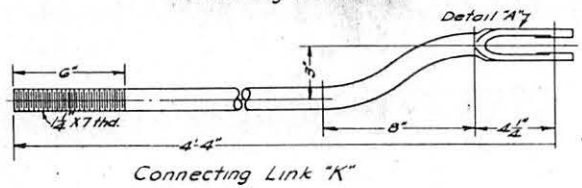
* Omit Link E and Order Link K for 100# Rail
** Omit Plate H and Order Plate J for 100# Rail

REVISIONS
7-12-51
9-30-53

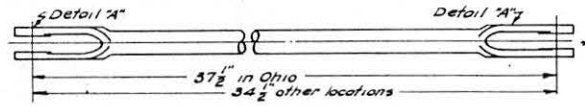
E-484-A
SHEET 2 OF 3
N. & W. Ry.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS
PIPE CONNECTED DERAILS
AND BOLT LOCKS
ROANOKE, VA.
OCT. 29, 1948



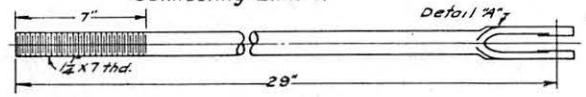
Connecting Link "E"



Connecting Link "K"

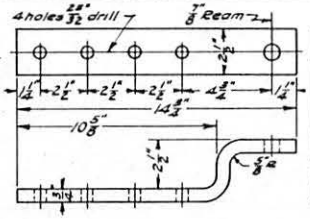


Connecting Link "X"

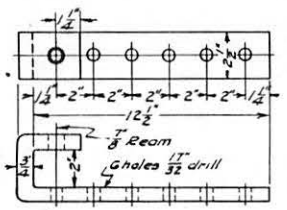


Connecting Link "Y"

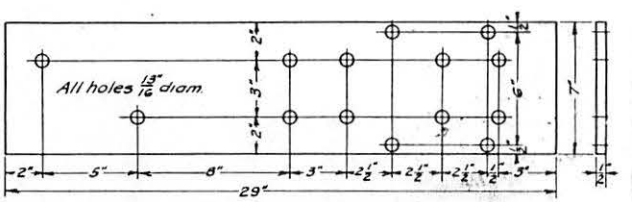
Furnish comp. with screw jaw, nut and lock washer



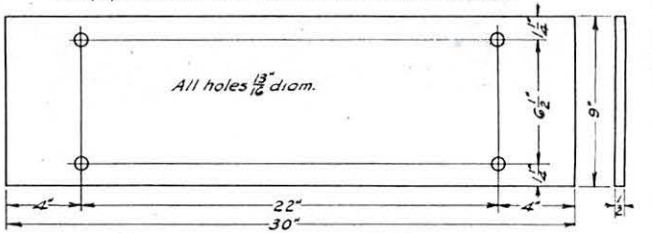
Connecting Plate "H"



Connecting Plate "J"



UNIVERSAL CRANK PLATE "A" STEEL
Shop paint one coat Zinc Chromate or Red Lead.



COMPENSATOR PLATE "F" - STEEL
Shop paint one coat Zinc Chromate or Red Lead.

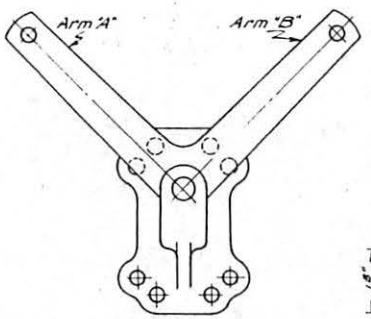
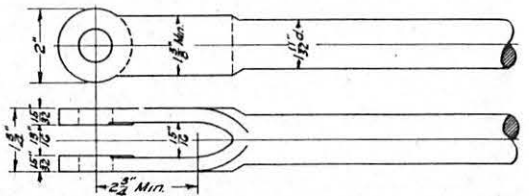
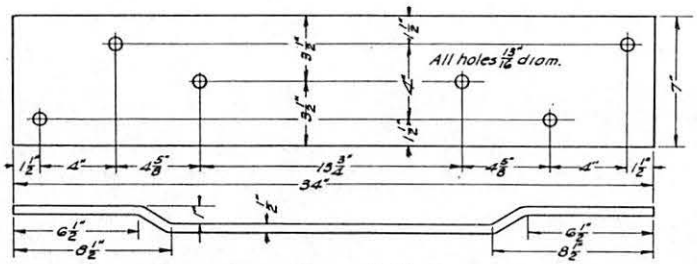


FIGURE 1

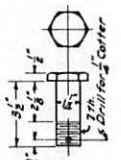
For reference in ordering cranks with set in arms. Specify arm "A" or "B" to be upset or downset required amount.



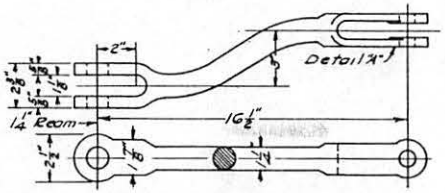
DETAIL "A" FORGED STEEL.



BOLT LOCK PLATE "G" STEEL
Shop paint one coat Zinc Chromate or Red Lead.



Furnish complete with thin castle nut and cotter



SWITCH CONNECTION "D", Comp. with 1¼" Bolt.

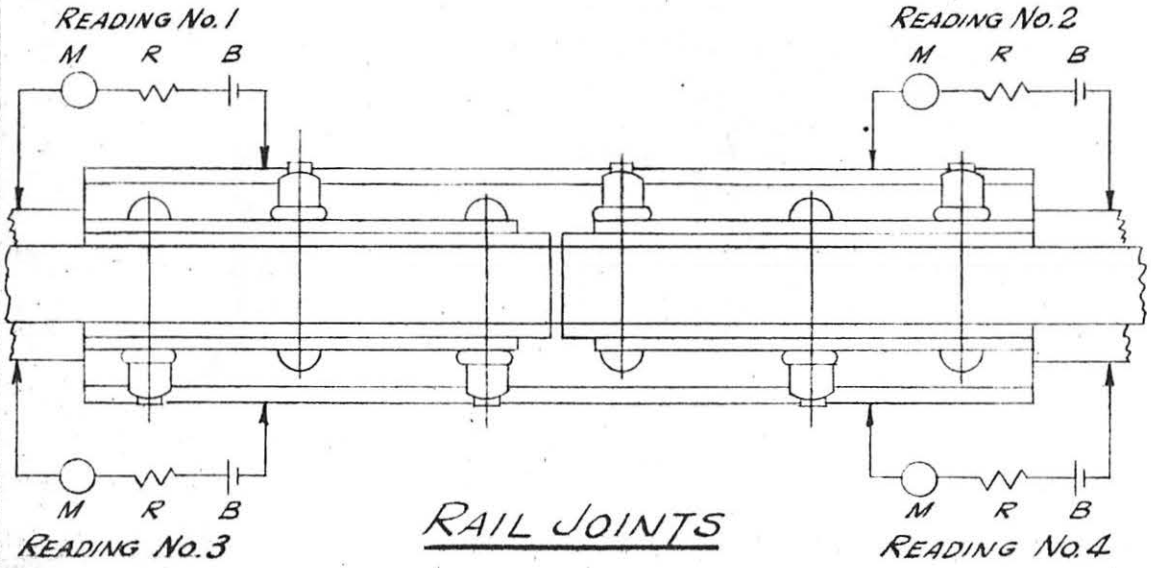
REVISIONS

SHEET 3 OF 3 E-484-A

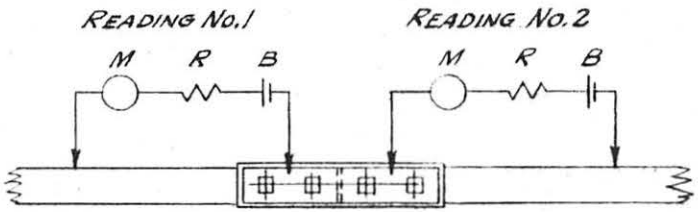
N. & W. RY.
OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

PIPE CONNECTED DERAILS AND BOLT LOCKS

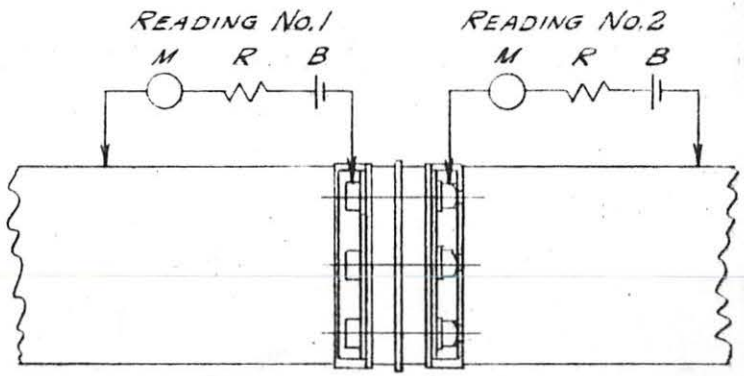
ROANOKE, VA. SEP. 30, 1953



RAIL JOINTS



SWITCH RODS



GAUGE PLATE

When TOTAL current reading for insulating rail joints or reading No. 1 or No. 2 for other insulation shown exceeds .020 amperes and track circuit is in difficulty, corrective measures to reduce the leakage are indicated.

To determine TOTAL current reading for insulating rail joint add the higher of readings No. 1 and No. 2 to the higher of readings No. 3 and No. 4

LEGEND
- M = D.C. MILLIAMMETER
- B = DRY CELL, 1.5 V. APPX.
- R = 4 OHM RESISTOR

ONE SHEET E-703-A

N. & W. RY.
OFFICE OF SUPERINTENDENT
SIGNALS AND COMMUNICATIONS

INSULATION TESTS

MAY 14, 1963.

Tie No. 1 - 7"X9"X11'-7"

Tie No. 2 - 7"X9"X11'-7"

FRAMING OF TIES.

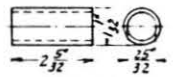


Fig. 2.
Fiber Bushing.

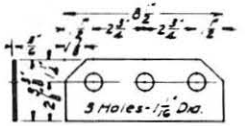
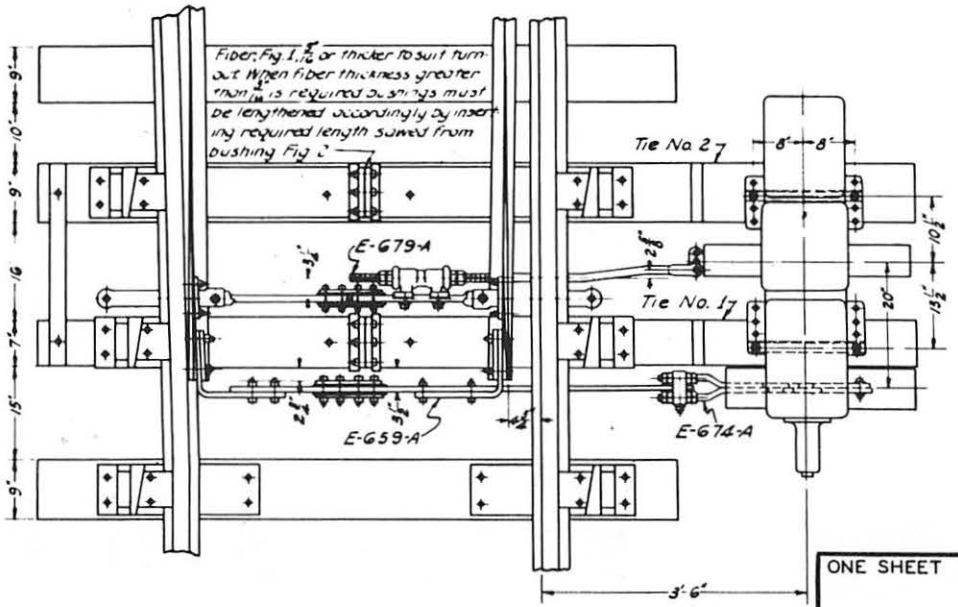


Fig. 1
Gouge Plate Insulating Fiber



REVISIONS
REDRAWN 9-30-47.
REV. 7-16-48. M.D.G.

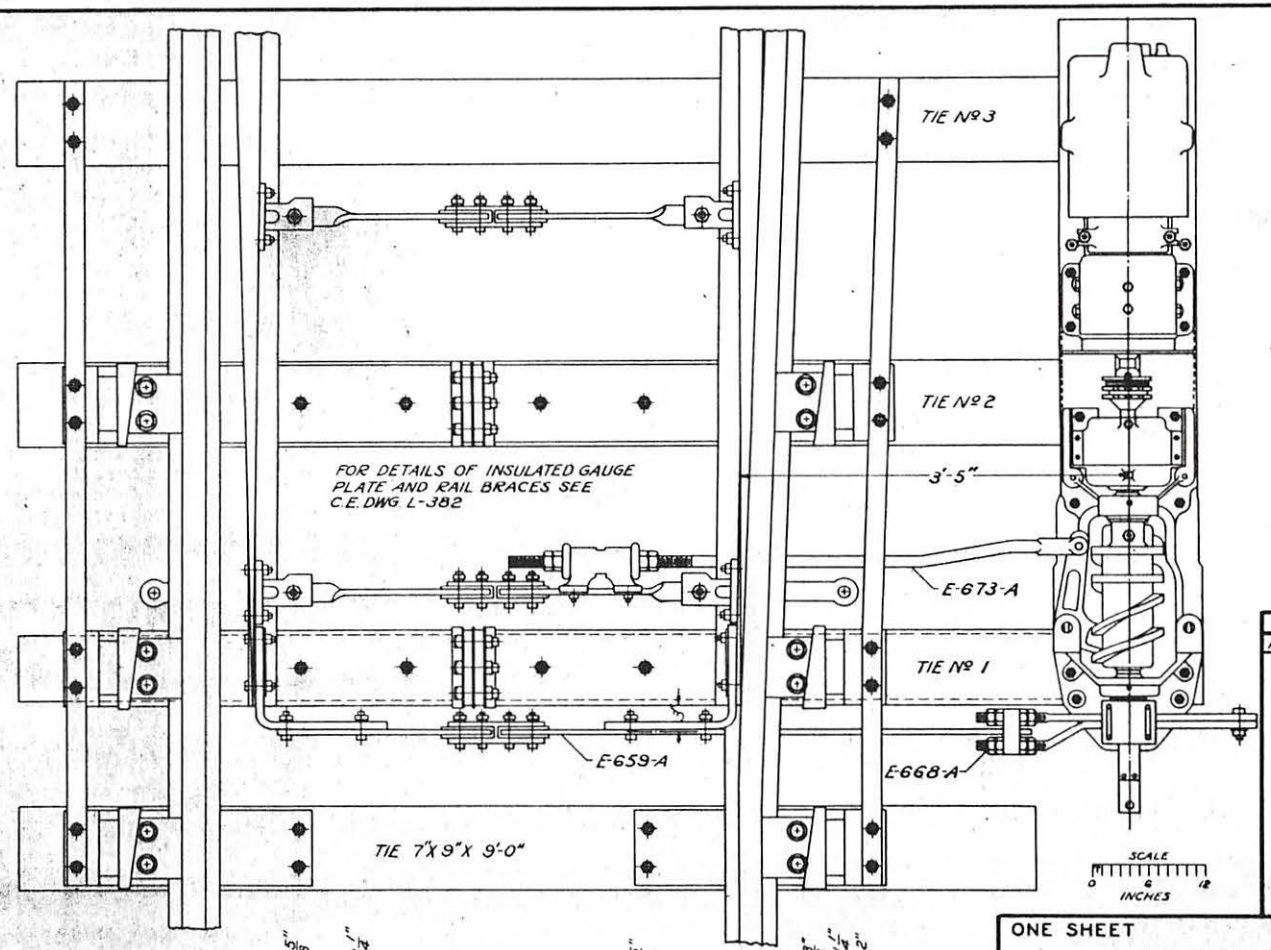
ONE SHEET E-502-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT, STYLE M2 ELECTRIC SWITCH MOVEMENT

ROANOKE, VA. MARCH 6,1930



REVISIONS

REV. & REDN. 10-2-44 MDM

ONE SHEET E-476-A

N. & W. Ry.

OFFICE OF SUPERINTENDENT
TELEGRAPH AND SIGNALS

LAYOUT, STYLE B3 SWITCH MOVEMENT WITH PLANETARY REDUCTION GEAR. FOR SINGLE SWITCHES.

ROANOKE, VA. JAN. 11, 1929